

TB

A Crossroads



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WHO Report on the Global Tuberculosis Epidemic 1998

WORLD HEALTH ORGANIZATION



ORGANISATION MONDIALE DE LA SANTE

An ancient disease is killing more people today than ever before. Tuberculosis - which many of us believed would disappear in our lifetime - has staged a frightening comeback.

This is not for lack of a cure. As this report shows, the DOTS strategy can work anywhere, even in countries that are economically devastated or at war. And TB control has never been so affordable. The powerful anti-TB drugs used in the DOTS strategy cost just a fraction of what they did a decade ago - as little as \$11 in some countries.

Our greatest challenges in controlling TB are political rather than medical. Many countries are still not using DOTS. The longer countries delay making TB control a high political priority, the more costly it will eventually be to fight the disease.

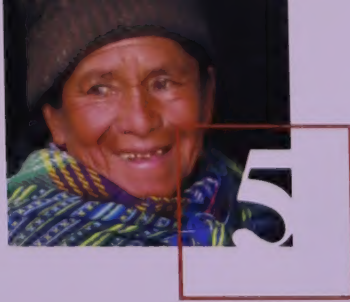
Already, multidrug-resistant strains - 100 times more expensive to treat - are emerging in "hot zones" around the world. These often-incurable forms of TB have a deceptively slow incubation period as they spread through communities. The social and financial cost of allowing MDR-TB to spread will not be felt until many years later.

We are at a crossroads. We can permit the TB epidemic to become more deadly. Or we can act now to end the suffering and deaths. I urge you to take the right course and join us to promote the use of DOTS to stop TB.



G. H. R. R. R. R. R.

Community Health Cell
Library and Documentation Unit
367, "Srinivasa Nilaya"
Jakkasandra 1st Main,
1st Block, Koramangala,
BANGALORE-560 034.
Phone : 55215



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From Peru to Vietnam, thousands of people are using the DOTS strategy to make an extraordinary contribution in the fight against TB and for the improvement of health services. Their stories are illuminating examples of how the dedicated involvement of one individual can contribute to the global success of DOTS.



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Countries face grim consequences if they are slow in implementing and sustaining effective TB control programmes. This creates a frightening backdrop to the fight against the epidemic and continues to exacerbate TB's impact on the world.



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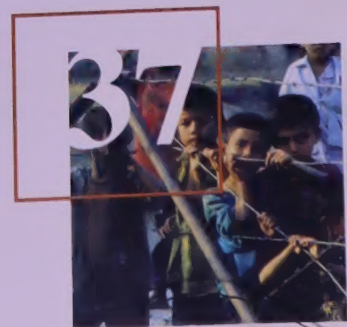
Americas

Eastern Mediterranean

South-East Asia

Europe

Western Pacific





A Crossroads in TB Control

We stand at a crossroads in TB control.

The story of tuberculosis in our age is one of stark contrasts. Never before has the world had at its disposal such a cost-effective TB treatment strategy that not only cures the disease, but also stops the deadly cycle of infection. The success of DOTS—Directly Observed Treatment, Short-course—has been proven in diverse areas of the world, such as China, Peru, Vietnam and Bangladesh, with cure rates of up to 95 percent, even in the poorest countries.

Yet, more people are dying of TB today than at any other time in history—between two and three million deaths each year. And still, only 15 percent of all people sick with TB are being treated by DOTS.

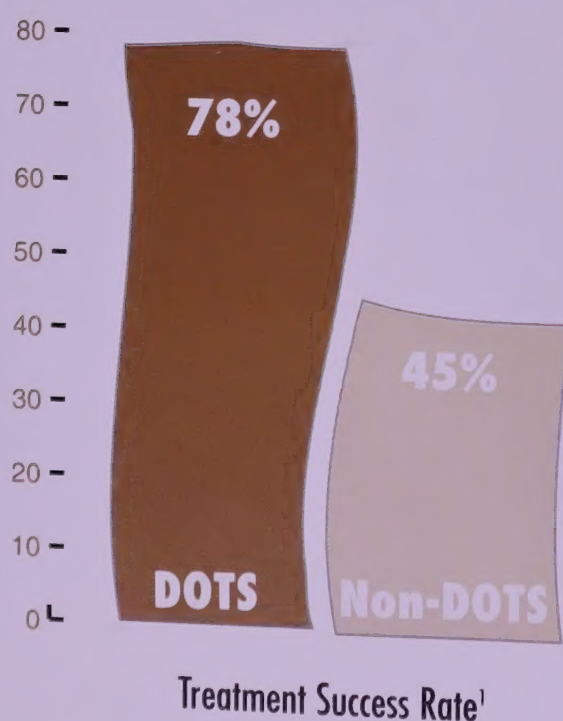
Two futures emerge

In these pages, you will meet individuals—health care workers, politicians, community volunteers—who are using DOTS to make an extraordinary contribution in the fight against tuberculosis. Their stories are illuminating examples of why DOTS works and why aggressive and sustained expansion of the strategy is needed to loosen TB's grip on the world.

You will also read about the horrific conditions people are facing in places not using the DOTS strategy—inferior or erratic drug supplies, programme mismanagement, worsening suffering caused by HIV/TB co-infection, and the proliferation of drug-resistant strains of TB.

The world has the tools and the resources to determine the future of the TB epidemic. It can be a future of expanded use of the DOTS strategy and the reverse of the epidemic—or a future in which multidrug-resistant TB increases and millions more become ill.

Reason for Hope



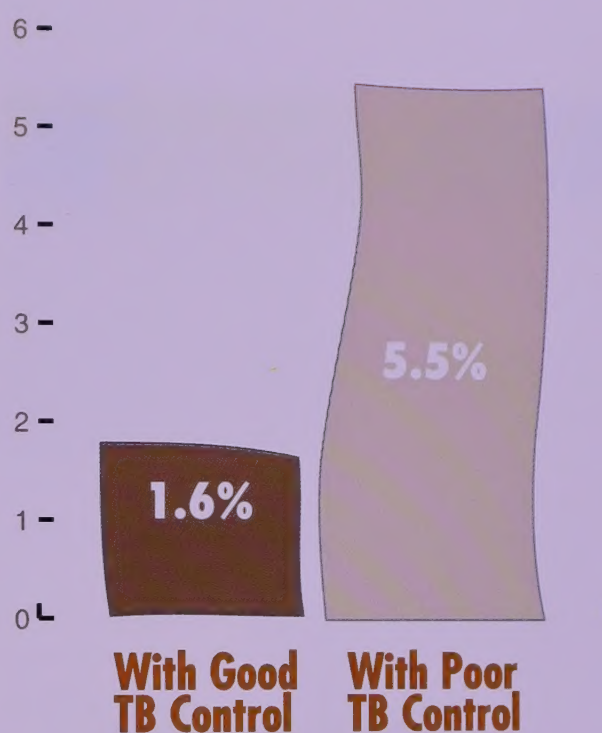
A time for action

There is little disagreement that DOTS is currently the most effective strategy for controlling TB. The greatest challenge that countries face today is a political, not a technical one. What is lacking is the political leadership necessary for countries to make TB control a priority.

The time has come for heads of state, finance and health ministers, development assistance agencies, non-governmental organizations, and the research community to make dramatic progress against this age-old killer.

With decisive action and strong political backing, those countries hardest hit by the epidemic today could be the success stories of tomorrow.

Reason for Alarm



Prevalence of Multidrug-Resistant TB²

1. *Global Tuberculosis Control—WHO Report 1998, Global TB Programme, World Health Organization, Geneva. Data represents treatment outcomes for 1995 collected from 181 out of 212 countries surveyed in 1997.*

2. *The WHO/IUATLD Global Project on Anti-tuberculosis Drug Resistance Surveillance (1994-1997) Countries with good TB control = greater than 33% DOTS coverage.*



DOTS — A World-wide Success Story

What is DOTS?

DOTS is the most effective treatment strategy available for controlling TB and one of the most rapidly expanding and successful health interventions of the 1990s.

DOTS was developed from the collective best practices, clinical trials and programmatic operations of TB control over the past two decades. The success of the strategy has been proven in both

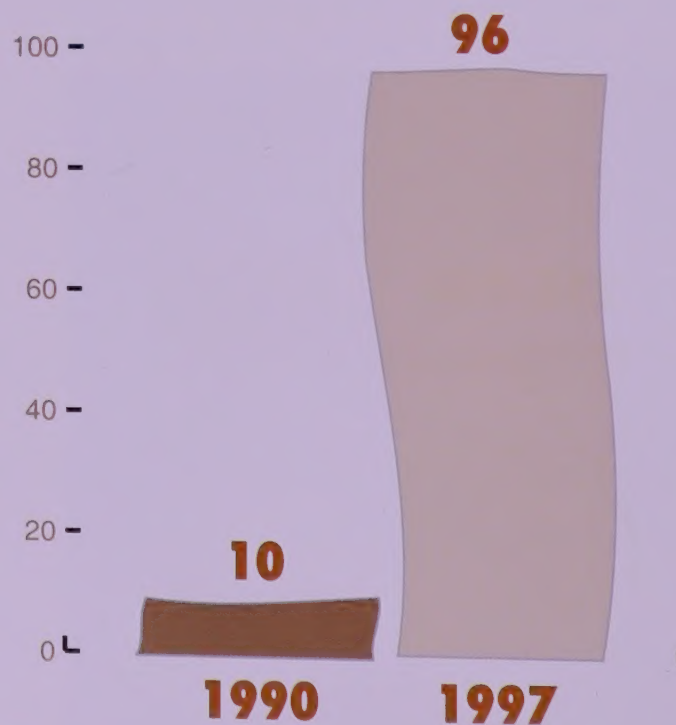
rich and poor countries, and under the most challenging conditions, including war-torn and economically devastated areas.



Its five critical elements work together to cure infectious patients and break the cycle of transmission. The elements are:

1. Government commitment to sustained TB control.
2. Sputum smear microscopy to detect infectious cases.
3. A standardized, short-course anti-TB treatment regimen of six to eight months, with direct observation of treatment for at least the initial two months.
4. A regular, uninterrupted supply of quality anti-TB drugs.
5. A monitoring and reporting system to evaluate treatment outcomes for each patient diagnosed and the performance of the TB control programme as a whole.

Rapid Acceptance of DOTS



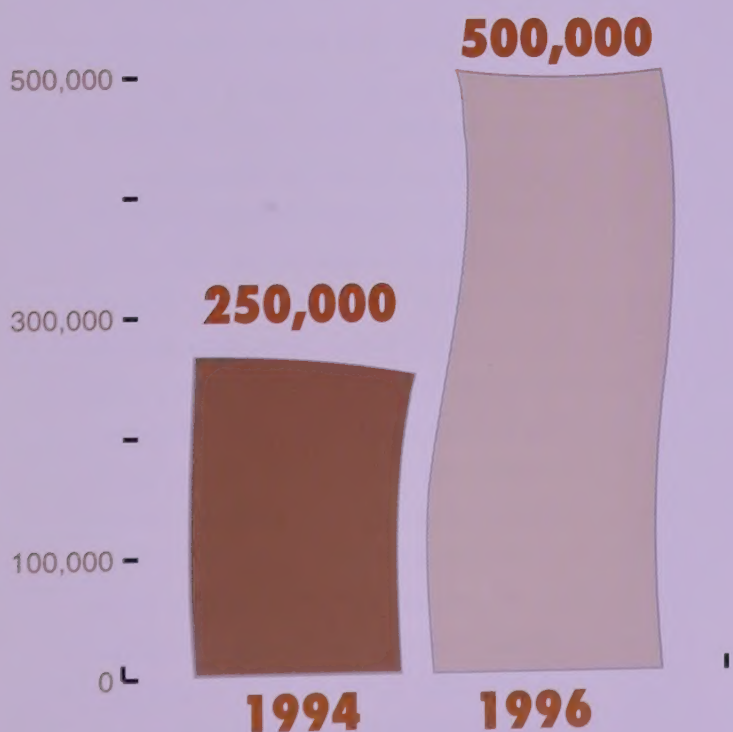
Number of Countries Implementing the DOTS Strategy³

Advantages of DOTS

- DOTS can produce cure rates of up to 95 percent, even in the poorest countries.
- The strategy can be integrated successfully within existing general health services to achieve widespread coverage.
- Case detection through sputum microscopy is accurate, simple and reliable.
- Trained health workers and community volunteers can administer treatment.
- DOTS doesn't require hospitalization or isolation. Patients can remain with their families and return to work in a few weeks.



Expansion of DOTS



Number of Infectious Cases Treated Annually by the DOTS Strategy⁴

- DOTS helps prevent drug resistance, which is often fatal and up to 100 times more expensive to treat.
- The DOTS recording and monitoring system follows each patient through the entire course of treatment to ensure a cure.
- As a management strategy, DOTS helps TB health officials monitor programme performance and quickly intervene to address problems.
- DOTS is a sound economic investment for any government. Each healthy year of life bought by using DOTS to cure TB costs as little as US \$3-5.

^{3,4} Global TB Programme, World Health Organization, Geneva

political will

"The government realized tuberculosis had a tremendously negative impact on the social, economic and political health of the country. They decided to make it one of their priorities."

TB cannot be controlled without government commitment

Dr. Guillermo Suarez won a major victory in convincing the government to support TB control.



Though they seem distant now, Peru's dark days of tuberculosis come back easily to Dr Guillermo Suarez, Peru's Chief of Communicable Diseases and Tuberculosis Control.

"Tuberculosis was everywhere in the 1980s," says Suarez, a stocky 41-year-old man who gestures expressively while he speaks. "It wasn't just the poor, but also the middle and upper classes. It touched almost every family in one way or another."

The Andean nation became known as a deadly reservoir for the disease. Although its 22 million people represent only 5 percent of South America's population, Peru harbored nearly one-quarter of all notified cases in the region. Peru's last and only hope, a tuberculosis control programme begun in the 1960s, was plagued by frequent changes in leadership, a skeletal budget and low morale.

"What was really missing," Suarez says, "was political support."

A hot political issue

Today, the country's brush with disaster is fading. A nationwide team of doctors, nurses, lab technicians, social workers and community volunteers run an impressive tuberculosis control programme based on the DOTS strategy with an 83 percent treatment success rate. The disease, now a national priority, was even a hot political issue in the last presidential election.

Among his colleagues at home and abroad, Suarez is widely credited as the doctor who, through his leadership, dedication and political savvy, won government support

PERU

The DOTS strategy was adopted in Peru in 1990 and currently covers the entire country. Rapid expansion was possible because the country already had a TB programme with trained general nursing staff in place, to which political commitment, sufficient resources for drugs and a dynamic leadership were added. Today programme activities are integrated in general health services and are reducing the number of TB cases and the risk of further TB infection in the community.

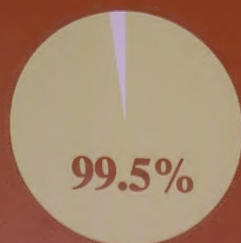
Strengths of the programme include the stability of the TB management team and a budget of over US \$5 million, now fully provided by the Ministry of Health. The President of Peru has given the programme his personal attention, and has maintained continuous public reporting on progress achieved as well as general information on the TB problem.

Because TB and other public health programmes are a national priority, TB treatment is free to patients, drug financing is maintained, and supervision at intermediate levels is ensured even with health sector reform.

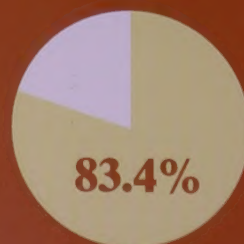
Technical assistance from WHO and the

Pan American Health Organization (PAHO) has contributed to the success of the programme, which is used as a model for training managerial staff from other Latin American countries and WHO consultants.

The main challenge facing the NTP is that to substantially reduce TB transmission, the programme has to be maintained for several decades. Maintaining political commitment and resources, and ensuring a cadre of trained personnel in all levels of the programme is a challenge for this long a period.



Infectious Cases Detected by DOTS (1996)



DOTS Treatment Success (1995)

and created one of the most successful tuberculosis control programmes in the world.

A graduate of the University of San Marcos in Lima, he put his medical degree and a master's degree in higher education to work as a private doctor, college professor and public health coordinator. In 1990, when a newly-elected government tapped him to head the national tuberculosis control programme, Suarez was already directing a small-scale TB programme in north Lima.

Suarez recognized that it was important for the programme to have professional technical support, but that the most critical thing was convincing politicians that the programme deserved funding. Persuading politicians to invest in a public health programme was difficult. Not only was the new government fighting feverish inflation, it was also struggling to end a guerrilla war that had killed thousands.

He shakes his head when he talks about the former programme. "It was archaic. There was no medicine, no way to track patients and the health workers' morale was terrible. Only half the people diagnosed with tuberculosis received treatment. Of those, only half were cured. We wound up with thousands of chronic patients infecting their communities."

A persuasive argument

Backed by a succession of health ministers, Suarez assembled a team of young doctors to evaluate the tuberculosis situation. Based on the known successes of short-course chemotherapy and directly observed treatment, this national team presented politicians with a new programme which came to be known as the DOTS treatment strategy. Not only was it necessary, they explained, it was effective and cheap. They were persuasive. "The government realized tuberculosis had a tremendously negative impact on the social, economic and political health of the country," Suarez says. "They decided to make it one of their priorities."

The budget went from \$600,000 a year to over \$5 million. The Peruvian government



TB treatment is free for the people of Peru.

demonstrated its confidence in the team and its solution by providing the majority of the money.

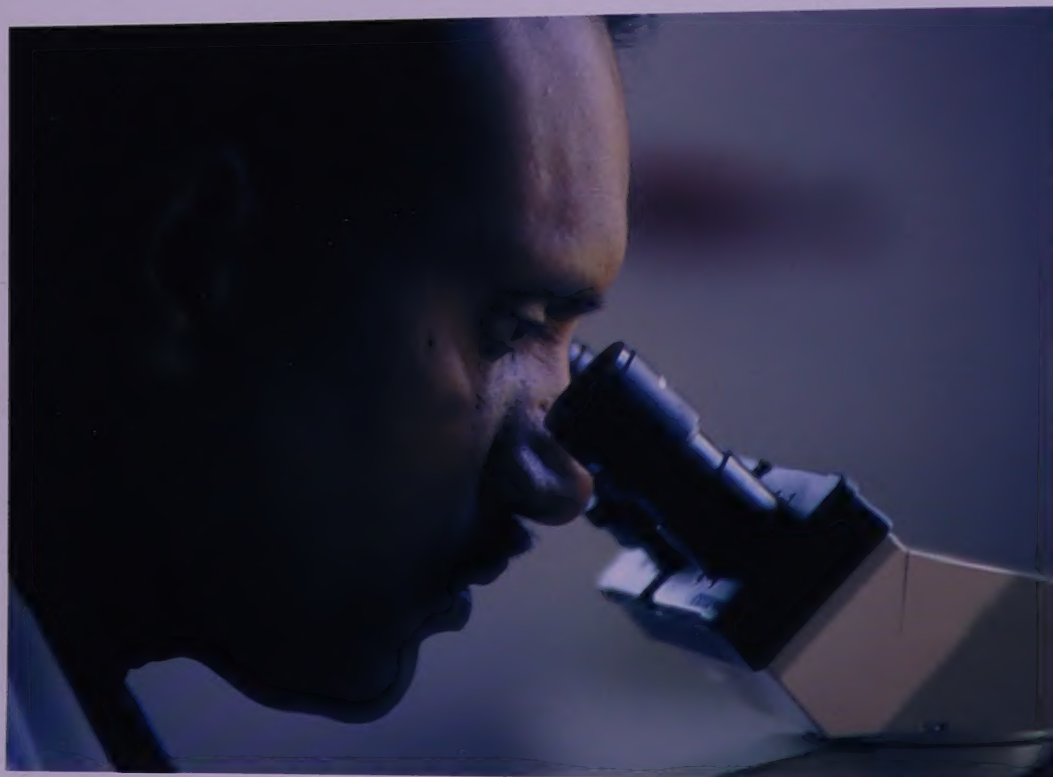
Suarez's days of interviewing patients and collecting sputum samples in the poorer neighborhoods have been traded for budget planning sessions and political meetings. His commitment to fighting tuberculosis, however, remains strongly personal.

"As doctors and as medical professionals we had reached a crossroads in the 1980s. We knew we wouldn't be able to wake up each morning and look at ourselves in the mirror if we allowed this epidemic to continue when we had the power to control it. We knew that this was a problem that only we could solve. Nobody else had as much to lose." He smiles for a moment and adds, "Or as much to gain."

microscopy

"I can't confirm pulmonary TB with an X-ray. The thing about a microscope is that you can see the bacteria with your own eyes."

Accurate diagnosis sets TB treatment in motion



Sputum smear microscopy is less expensive and more accurate than using X-rays for diagnosis of TB.

It wasn't a fever that made Sahnas Khatoon shiver with every shallow breath. It was fear. Sitting between her mother and father on a worn wooden bench at the Shyamoli Tuberculosis Clinic in Dhaka, Bangladesh, the slim 18-year-old knows two things—she was getting sicker every day and nobody could tell her what was wrong. Her parents had brought her to the clinic to be tested for TB on the advice of a private doctor. As she waits to hear the results, Sahnas stares off at a spot on a distant wall and shivers.

"I can't bear to see her crying so much," says her father. "She has given up hope." Last week he borrowed money and brought Sahnas to a private doctor. "He told me to take her to Shyamoli because the drugs and treatment would be free here." The clinic, a 15-minute walk from the choked slums where Sahnas' family lives, is one of the largest TB clinics in Bangladesh.

A few minutes past nine, a doctor meets with her and explains that she has tested positive for tuberculosis. He also tells her it is curable and she will start feeling better as soon as she begins treatment. Sahnas' father is exuberant and her mother struggles to keep a modest smile from showing. Then the doctor leads Sahnas to the DOTS programme office so she can take her first dose of drugs.

The most terrifying and frustrating time for many TB patients comes before they are diagnosed with the disease. Exhausted by long coughing spells, fatigue, fevers and a loss of appetite, many are terrified that they have cancer, AIDS or another incurable disease.

Reliable diagnosis a cornerstone of DOTS

Yet, diagnosing pulmonary TB is a routine task that requires only a skilled laboratory technician, a microscope and sputum samples from the patient that will be examined for the presence of TB bacilli. Sputum smear microscopy is a cornerstone in the DOTS strategy that sets treatment in motion and thereby breaks the chain of infection.

Dr Tahsin Begum, 36, a medical officer with the government TB control programme, says identifying patients with the disease is critical. "An accurate, early diagnosis is important because immediate, effective treatment stops the spread of infection," she says. "It is also much easier for us to treat people if we catch them in the early stages of the disease before major damage has been done."

Smear microscopy is the most practical way to positively identify the infectious form of TB in adults, says Dr Moshtaque Choudhury, a physician at the Shyamoli Clinic. "X-rays are presumptive. I can't confirm pulmonary TB with an X-ray. I might

Sahnas Khatoon, 18, feared that TB was incurable until she began treatment using the DOTS strategy.



see cloudy shadows on the film, but that could indicate another disease," he says. "The thing about a microscope is that you can see the bacteria with your own eyes."

In addition to being more accurate than X-rays, microscopy smears are also considerably less expensive. "The savings are very important," Choudhury says. "It costs less than 2 taka (US ¢ 5) to do a smear. An X-ray can cost the clinic as much as 200 taka (US \$5)." Choudhury emphasizes that microscopes can be purchased for as little as US \$1,000, a fraction of what an X-ray machine costs.

In countries with agricultural populations scattered over large geographical regions, microscopes offer additional benefits beyond financial savings. They are easily transported in a vehicle or on a bicycle and don't require electricity as they can run off nothing more than sunlight reflected through coin-sized mirrors.

An accurate gauge of patient progress

In a rural clinic outside the city of Pabna, Jahurul Islam tests an average of 40 patients every day. Sitting at a binocular microscope, he explains that he will test three different sputum samples for all patients suspected of having an active case of TB. He smears the samples on glass slides and uses a staining technique to highlight TB bacteria under the microscope. It takes about 20 minutes to prepare a batch of slides. Islam then carefully examines each one, searching for thin red tuberculosis bacteria. "If we diagnose the patient with pulmonary TB, they are listed in the register and started on the DOTS regimen," Islam says.

Laboratory technicians like Islam do more than just help cure people and stop the spread of TB.

They can end months and sometimes years of emotional torment — fear, worry and shame.

Back in Dhaka, Choudhury visits Sahnas' home after her first treatment. Choudhury cautions Sahnas that it might take a week or two before the medicine makes her feel better. A shy smile crosses her face for the first time in a long time and she replies, "I'm no longer worried. That makes me feel better already."

BANGLADESH

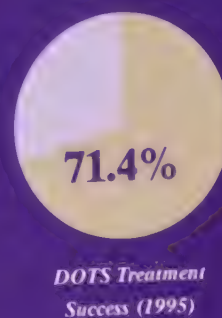
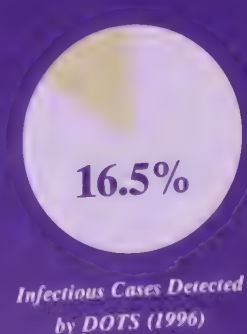
The DOTS strategy was adopted in Bangladesh in 1992 and now covers 78 percent of the country's population. The National TB Control Programme (NTP) is a component of the Fourth Population and Health Project (FPHP) and is integrated with the leprosy programme. It is financed by the Government of Bangladesh, the International Development Agency/World Bank (IDA) and the Government of The Netherlands.

The programme, one of the largest within the FPHP with a budget of US \$17.2 million, is characterized by strong government commitment. This has ensured that sufficient staff, drugs and supplies are made available for areas covered by DOTS. Despite low case detection rates in 1996, the last official reporting period, Bangladesh has made enormous progress since then while maintaining a high treatment success rate. Recent field reports show a treatment success rate of 80 percent and an infectious case detection rate of 47 percent.

Collaboration with NGOs, such as the Bangladesh Rural Advancement Committee (BRAC), has been intrinsic to the success of the

NTP. Six main NGOs operate within the NTP and cover 35 percent of the country. The collaboration between the government and NGOs is based on a Memorandum of Understanding whereby NTP implementation is coordinated and ensured within national standards.

The NTP's estimated case detection rate, however, is low and impedes the programme's efforts to reduce TB transmission. Still another challenge is the sustainability of the programme and its funding when the new national five-year health plan (HAPP-5) is implemented in mid-1998.



cost-effective

"With DOTS in place, the cure rate has doubled and overall costs for TB control are lower. We are protecting both our citizens and the workers vital to our economy."

A healthy workforce makes sound economic sense



More than half a billion people in China are covered by the DOTS strategy, but coverage must be expanded to more of the country.

Guangdong's Pearl River Delta is one of the richest agricultural areas in China. Over the past ten years, it has developed into a dynamic economic region that is now China's largest exporter and the country's leader in attracting foreign investment. More than US\$30 billion has been invested in Guangdong in the past 15 years, and there are currently more than 26,000 foreign enterprises in the province.

Guangdong's strong economy and high standard of living attract workers

from all over China. Government officials estimate that there are about 10 million migrant workers in the province today. In Shenzhen City, migrants make up 60 percent of the total population.

Health officials say that TB is common in migrant populations. When these workers develop infectious TB, they can remain untreated as health care systems have a hard time reaching mobile populations.

"The problem of tuberculosis among migrant workers has become more serious since economic reform was implemented because there

are increasing numbers of these workers in the area," says Dr Tang Da Rang, Director of the Tuberculosis Control Project Office for Guangdong Province. "Local TB control offices face difficulty in dealing with it. Often these patients have no fixed address, and they keep moving from here to there. They often live in cramped, temporary housing and spread TB to others living around them."

TB control tied to economic gains

Yet, Guangdong government officials are aware that a healthy workforce makes economic sense. That's why TB control is a priority in Guangdong, one of 13 provinces in China taking part in the Infectious and Endemic Disease Control Project (IEDCP), supported in part by a loan from the World Bank. Through this project, more than 560 million people in 1,149 counties were covered by the DOTS strategy by the end of 1996. Treatment success rates of more than 95 percent are being achieved, and more than half a million infectious TB cases have been cured.

The economic benefits of effective TB control are two-fold. In addition to protecting human resources in a country, the DOTS strategy has also been ranked as one of the most cost-effective of all health interventions. For example, a six-month supply of drugs under the DOTS strategy costs as little as US\$13 in China, making the strategy a sound investment for the Chinese government as it decides how to allocate its health care budget.

In the IEDCP provinces, the Chinese government committed counterpart funds matching the amount of the loan from the World Bank. These funds permit TB patients to be treated for free. In the rest of the country, there are not sufficient funds for priority health programmes, including TB, and patients have to pay for all services and drugs.

Through the Guangdong Provincial TB Control Office, officials initiated training programmes for health workers. Today, there are 1,110 health care staff⁷ who have been trained in TB control, which is part of the general health services. The province's municipal and county governments also mounted a massive publicity campaign to promote awareness about TB and motivate migrant workers who think they might be sick with TB to come forward for examination and treatment.

"In Shenzhen City they have been quite successful in publicizing free TB treatment among the workers. From 1993 through September 1996, just over 2,100 TB patients were registered. All of them completed treatment," says Tang. "Before the DOTS strategy, patients did not receive free treatment. With DOTS in place, the cure rate has doubled and overall costs for TB control are lower. We are protecting both our citizens and the workers vital to our economy."

Future gains depend on government support

With the World Bank loan slated to end in 1998, the question is whether the Chinese government will show the political and financial commitment necessary to maintain the high-quality TB control that exists in the provinces covered by the DOTS strategy and to expand coverage to the entire country.

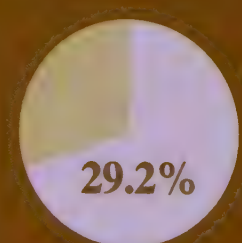
"As the economy continues to develop in Guangdong province, we hope to be able to continue and even expand TB control," says Tang. "But allocating money for health care is China's biggest problem. TB is a very serious disease, and China has a large population. Funding for the programme is very important. Our government puts up some money, but without continued commitment to the project, progress could slow."

CHINA

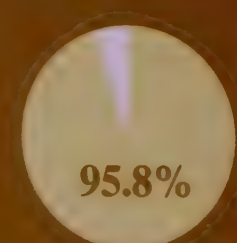
Pilot projects in Beijing during the 1980s and a 1991 pilot project in six rural counties of the Hebei province proved the feasibility of using the DOTS strategy in both urban and rural areas of China. In 1992, the DOTS strategy was expanded to 13 provinces in a World Bank-supported project (Infectious and Endemic Disease Control Project-IEDCP). More than 560 million people in 1,149 counties were covered by the DOTS strategy by the end of 1996. Treatment success rates of more than 95 percent are being achieved.

Overall, China has not made a political commitment to introduce DOTS in the whole country nor to maintain DOTS activities in the provinces and counties currently implementing them once the World Bank funding is finished. In the IEDCP provinces, the government committed local funds to help with TB until the end of the World Bank supported project. These funds permit TB patients to be treated for free. In the rest of the country, there are not sufficient funds for priority health programmes, including TB, and TB patients have to pay for all services and drugs.

The major challenge China faces is how to sustain and expand DOTS programmes for the entire country. A key financial issue is the feasibility of charging patients or finding a means to continue to provide treatment for free. Another financial issue is how central drug procurement may be maintained and expanded nationwide. Because of health system reforms in the early 1980s, a mechanism doesn't exist that would allow provincial and county governments to pay for drugs at the central level. Yet, only through central drug procurement can the quality of TB drugs and their cost-effectiveness be ensured.



Infectious Cases Detected by DOTS (1996)



DOTS Treatment Success (1995)



Effective TB control protects human resources.

community action

"We started by inviting everyone, including the traditional healers, to an initial meeting to gain their trust in the DOTS strategy. And those people continued to be involved."

Volunteer networks form DOTS foundation

Standerton, an otherwise unremarkable industrial town 100 kilometers southeast of Johannesburg, has in the space of two years become a showcase demonstrating to the rest of the country how to control TB.

It wasn't something imposed on the community by outsiders. This success story resulted from women coming together, identifying a problem and working out how to tackle it together, as a volunteer brigade within the community. In the process, it has provided yet another model for the new South Africa to use the talents and resources of all races, churches, social classes, businesses, the local health department and voluntary organizations.

Leading the volunteers of the Standerton initiative is Trinette Patterton. As a magistrate in

the town, this imposing 57-year-old authority does more than dispense justice. She oversees the DOTS strategy for her community. Her enthusiasm—more infectious than TB itself—is drawn from personal experience. "My sister and I both contracted TB as school girls. I remember just how damned ghastly it was," she says. "If it could happen to me, it could happen to anyone. We were from a well-off family who could afford the best treatment available, which is not the situation for the vast majority of South Africans."

She followed her grandmother's example by joining the South African National Tuberculosis Association (SANTA). Patterton now works as a facilitator, visiting patients' homes and arranging the best person to oversee the intake of medicines. One such person is treatment volunteer Lydia Fleurs.

Relationships a top priority

Personal friendship provides the social glue which makes the Standerton initiative stick together. "I have known Lydia since I came to Standerton in 1986. She knows the people of this community better than anyone," says Patterton, who has recently hung up her black gown and retired from the bench to concentrate more on her TB work.

Fleurs' contribution is immense. She walks a few kilometers a day to visit her patients mainly in the sprawling township of Sakhile just outside Standerton itself. "For me, it is an opportunity to serve the community, not only my TB patients," Fleurs says.

Soon, the entire community was involved. "The biggest breakthrough for the community was when the traditional healers got involved," according to Communicable Disease Coordinator Riensie Vellema. "We

SOUTH AFRICA

A DOTS pilot project was implemented in the Mpumalanga province of South Africa (population 3 million) in 1994. Based on cure rates of 80 percent in the pilot area, a revised national TB control strategy, with standardized treatment policies, was officially introduced in January 1997. Previously, TB services were fragmented and based on high-cost diagnostic tools, hospitalization and self-administered short-course chemotherapy.

During 1997, TB was declared a "provincial emergency" in Western Cape province and a national priority in the country. However, progress in expanding DOTS coverage in the country has been slow. TB services are still not well coordinated, and treatment outcomes are yet to be evaluated because changes to the recording and reporting system are just being implemented.

Sufficient financial resources (Rands 500 million or US \$125 million per year) are available in the country for TB control, but

these resources are consumed by overuse of sputum cultures for diagnosis, treatment of multidrug-resistant TB cases, and inappropriate hospitalization. Already 1-2 percent of patients have MDR-TB.

DOTS demonstration areas have been introduced without adequate training of personnel. However, plans are being made to strengthen support of DOTS projects from the central unit (training, monitoring and analysis of reports) in order to expand coverage and develop provincial model centers for training.





75 volunteer treatment supporters ensure that TB patients in Standerton receive the correct dosage of life-saving drugs.

A strong community network

The mainstay of the initiative, however, is the 75 volunteer treatment supporters who have been trained since the programme started. As well as caring for patients with TB, they also carry out general health promotion tasks including distributing condoms to protect against HIV and sexually transmitted diseases, a growing problem.

For the women of Standerton, implementing DOTS has certainly not been an easy job. Dr Elsa Balt, TB Coordinator for the Mpumalanga province, warns against anyone underestimating the scale of the challenge.

"It took quite a time to get people to change their minds. At the start, this idea was not well accepted and it was something we had to work on," she says. "You can't just sit down and say you are going to start implementing DOTS. There has to be a whole group of people who are well trained and work together. Now we are seeing a solution to the problem and genuine benefit to the community in many ways."

Trinette Patterson, right, a former magistrate, now leads a volunteer brigade of treatment observers.

started by inviting everyone, including the traditional healers, to an initial meeting to gain their trust in the DOTS strategy. And those people continued to be involved."

These traditional healers, or sangomas, are trusted by the vast majority of the population and are typically contacted first by sick persons and their families for health care and emotional support. Carefully instructed, the sangomas are happy to help with the patient observation component of the DOTS strategy, which they call "English medicine." They gain patient trust because the treatment works.

The DOTS programme began in January 1996 and covered only about 4 percent of the patients. Now it covers virtually 100 percent of TB patients in the district and the documented cure rate among the initial group of patients was well above 80 percent in Standerton. The impact of HIV has now reduced the cure rate as some patients are dying of other causes while they are still on TB treatment.

The programme has strengthened its patient monitoring system. Vellema keeps a map with little flags that mark the location of patients currently being treated. These visual reminders are evidence of a system committed to ensuring that once patients start treatment, they are followed through until completion of the entire regimen.



"There were compelling reasons for coordinating the programme. We needed to ensure everyone was following the national guidelines so we would know the fate of the patients and could track results."

Government-NGO cooperation strengthens TB programmes

"Before the Kathmandu Valley was united in the 18th century by the Gorkha king Prithvi Narayan Shah, the (Nepalese) cities of Kathmandu, Patan and Bhaktapur were all separate kingdoms," explains Sandeep Chitrakar, a TB control worker at the DOTS clinic in Bhaktapur. "There were many kings and each one ran his kingdom differently. The laws varied in every city according to the king."

Chitrakar could just as easily be describing the TB control situation in Nepal before the government and NGOs decided to coordinate their efforts to fight TB in 1995.

"Everyone had a different regimen," Chitrakar says. "The government had their system for treating patients, the NGOs had their regimens and so did the private doctors. Now, the country has adopted one case management strategy-DOTS, which includes a standardized drug regimen," he says. "As DOTS coverage expands, you will see the same treatment in Bhaktapur as you will see in a clinic in the far east of Nepal or in the far west. And we all share the same goal—to cure 85 percent and detect 70 percent of infectious TB cases."

Only a few years ago, these goals would have been beyond Nepal's

reach. Poor TB control was leading to chronic cases which continued to spread infection. Poverty, crowded living conditions and a lack of health care infrastructure in remote areas exacerbated the spread of TB and accelerated the breakdown from infection to disease. The national TB programme now estimates that six out of every ten adults are infected.

Community problem-solving

When the kingdom first opened its doors to outsiders in the 1950s and 1960s, there was an influx of NGOs offering to help the government provide health and social services. After the National TB Centre and WHO conducted a joint review of the programme in 1994, NGO involvement was coordinated and strengthened. "We took a long hard look at what the situation was in our own country with this silent epidemic," says Dr Dirgh Singh Bam, Director of the National TB Centre. "We immediately invited all the NGOs to participate in a five-year programme development plan." DOTS demonstration sites began in early 1996.

The main NGOs and other agencies working with TB patients in Nepal include the Britain Nepal Medical Trust, International Nepal Fellowship, Japan International Cooperation Agency, German-Nepal TB Project, Netherlands Leprosy Relief Association, Norwegian Heart and Lung Association, Medecins du Monde, United Mission to Nepal and the Nepal Anti-TB Association. Each was assigned a region of the country in which to coordinate TB control efforts.

The government, together with the NGOs, decided there had to be uniform diagnosis, treatment and reporting for everyone — key elements of the DOTS strategy. "We needed to

Mohammed Akhtar works for the Britain Nepal Medical Trust, an NGO that helps ensure a dependable drug supply for one region of the country.



ensure everyone was following the national guidelines so we would know the fate of the patients and could track results,” says Bam.

Tangible outcomes shared by all

The results were immediate and tangible. Bam remembers when the government decided it needed help in drug distribution. “We had a centralized drug distribution system where the medicine went from the central to regional offices and from there to the district offices and on to the outposts,” he says. Although this worked fine in the urbanized Kathmandu Valley, it was a serious challenge in the more remote regions. “There was a shortage of medicines in many areas,” Bam says.

What could have been a disaster, however, turned into a success when the government asked the Britain Nepal Medical Trust for help at one of the coordination meetings. The NGO immediately offered to take over drug distribution in its region, which has led to a dependable drug supply.

Beyond the day-to-day business of fighting TB, there is another reason to coordinate government and NGO resources. Most NGOs see their purpose as helping a government for a limited amount of time. They will not be in Nepal forever.

“It is good this coordination has happened,” said Dr Mohammed Akhtar, 38, the TB/Leprosy Coordinator with the Britain Nepal Medical Trust. He has run the DOTS clinics in the highland region of Dhankuta for the last three years. “We cannot guarantee how long we will be in Nepal. It all depends on funding,” he says. “But if we pull out tomorrow, we will leave behind trained Nepalese staff, a functioning clinic and enthusiasm.”



Nepal's goal is to coordinate TB control in all regions of the country, and expand coverage to rural villages, mountain regions and urban slums.

NEPAL

The Government of Nepal introduced the DOTS strategy in the National TB Programme (NTP) in early 1996 in four demonstration sites. Encouraged by the initial results, the NTP decided to expand DOTS, which now covers more than 37 such demonstration sites and 17 percent of the population. Because the programme is so new, treatment success rates are not available for the most recent official reporting period (1995). However, reports from the field show cure rates of 87 percent are being achieved in the first four DOTS demonstration areas.

A key feature of DOTS in Nepal has been NTP partnership with other organizations. International and national agencies such as WHO, the International Union Against Tuberculosis and Lung Disease, the Japan International Cooperation Agency, the Norwegian Heart and Lung Association, and the Norwegian government have provided technical and financial support to the NTP. NGOs support TB control efforts in three of the five regions as counterparts to government services, assisting with logistics, training, supervision, and reporting.

Because only 17 percent of the country is covered by DOTS, the overriding challenge for Nepal is expansion of the programme. Sustainability and expansion will require the ongoing leadership from the NTP's director, increased financial support from the government and continued donor and NGO interest in the programme.

A future challenge is working with communities to provide DOTS in remote rural villages, and in Nepal's mountain regions and urban slums.



dependable drug supply

"[A regular drug supply] is not only about avoiding multidrug resistance. It is also about patients having confidence in their health care system."

DOTS guarantees availability of life-saving TB drugs

"A regular TB drug supply is an obligation we have to our country and to our people," says Dr Kallaf Ouchrif, a Ministry of Health Deputy for the prefecture of Rabat, Morocco. "If you can't ensure a regular drug supply, you could condemn your patients to develop a drug-resistant form of TB that we might not be able to cure."

With almost three decades of his professional life dedicated to controlling TB and other infectious diseases, it is no coincidence that Ouchrif is respectfully known by his colleagues as the dean of public health in Morocco.

Ouchrif laughs when questioned why a constant supply of drugs is important. "I only need to

remember what the 1960s were like in Morocco to answer that question. TB was a nightmare.

Sometimes we had drugs, sometimes we didn't.

What nobody realized at the time was that it would have been better if we had never even tried to treat TB than to forge ahead with only partial supplies."

If you are going to fight TB," says Ouchrif, "make sure you have the right ammunition, the right drugs."

The right drugs in the right combinations

Isoniazid, rifampicin, pyrazinamide, ethambutol and streptomycin are powerful drugs that destroy TB bacilli. What makes TB a challenge to treat are the bacilli's natural resistance to some of these drugs and their hardiness. While most bacilli can be killed in the initial two weeks of treatment, some remain dormant for months. Treatment of infectious TB demands regular doses of drug combinations for at least six to eight months to fully cure a patient.

"There is a very real danger if patients start a treatment regimen, but fail to take all their drugs in the appropriate combination and for the appropriate duration," Ouchrif explains. "You might have killed some of the TB bacteria in the initial phase, but really you've only killed the weak ones. The ones you haven't killed will come back with a vengeance, and this time it is highly likely that some of their offspring will be resistant to the drugs already used."

Several miles southwest of Rabat is the Aakari Clinic. The clinic, like most in Morocco, has had a regular supply of TB drugs for the past several years. Part of this success is attributed to the government's

MOROCCO

Morocco began implementing the DOTS strategy in September 1991. TB control is a self-sufficient activity of the Ministry of Health and receives no external funding at this time. The programme has been successful because of the government's strong political commitment and guarantee of resources, including a reliable drug supply. Morocco also has banned the over-the-counter availability of anti-TB drugs and is one of only a few countries that strictly controls the distribution of these drugs.

One of the strongest aspects of Morocco's TB approach is its recording and reporting system. Information has been readily available to help monitor the success of the provinces and districts, as well as the quality of the data being reported. The programme has been particularly effective at tracking the transfer of patients at the national level.

Morocco has made significant progress integrating TB control activities at the district level into existing health care services. General practitioners are trained in the DOTS strategy and almost all diagnosis and

treatment takes place at the lowest health service level. Only five percent of TB cases are treated in the private sector.

As part of their medical training, all new chest physicians must work for several years in the TB programme. Thus, before moving to the private sector, these doctors have good exposure to the DOTS strategy and are fully knowledgeable of the national guidelines.

A future goal of the health services dealing with TB is to collaborate further with the private sector and hospitals in the country's larger cities.

94%

Infectious Cases Detected
by DOTS (1996)

84.2%

DOTS Treatment
Success (1995)



A highly effective drug tracking system designed by Dr Salah-Eddine Ottmani (center), is used in every province

commitment to fighting TB. But part of it also has to do with the national TB programme's simple, but highly effective, drug tracking system, which is an essential part of the DOTS strategy.

A series of elementary math equations help the TB control workers at the clinic establish the right numbers of drugs to order, and in what combinations. The equations used were created in a computer spreadsheet software programme. Dr Salah-Eddine Ottmani is the brain behind the system. The national TB programme manager in Morocco and a chest physician by training, Ottmani designed the computer spreadsheets. "It only took me three days," he says. "But since then it has saved us countless hours of guesswork."

The spreadsheets are used in every province. "If they don't have a computer or software training, then we send them the calculations on a sheet of paper."

Building confidence in health services

Later that afternoon, Ottmani stops off at the Kouass Depot, a warehouse half the size of a football field. He slides open a large blue door and walks into the dim interior filled with rows of wooden shelves with cardboard boxes stacked almost to the roof. The drugs start out at a national pharmacy warehouse in Berrched, outside

Casablanca, and arrive at the depot for distribution to clinics.

Ottmani says that having a regular drug supply is important beyond simply curing people. "It's not only about avoiding multidrug resistance," he says. "It is also about patients having confidence in their health care system. If patients start treatment and then have to stop it and start it again, they will lose confidence in the public clinics."

Once the patients disappear from public health clinics, it is much harder to keep track of them. "These people have dropped out of your sight and out of your control. They are no longer in your information system," Ottmani says. "Soon you have no idea how many patients you have and whether or not they are being cured. That is no way to fight an epidemic."

Patients make the journey to the Aakari Clinic where they are confident of receiving effective TB care—and a regular supply of drugs.



monitoring progress

"The log books are a testament to the medical success of DOTS. Red plus signs, indicating infectious tuberculosis, quickly turn to blue minus signs, indicating successful treatment."

Everyone is accountable with rigorous record-keeping

All that is left of Bernardo Martinez's short life are 20 worn sheets of paper held together by a rusted paper clip. While she absently leafs through the collected medical reports, Francisca Sandoval, 63, a nurse at the San Manuel Morales Health

Center in Bluefields, Nicaragua, remembers the 15-year-old boy with a mixture of fondness and regret.

"When he came in he was a fat, happy little boy," she says. "He was such a good child, he always took his pills every day without complaining, even in the end when he knew he was dying." Her fingers pause on a page where a doctor had sketched two teenage lungs, eaten away by tuberculosis.

Bernado was infected by a boarder in his mother's house, a woman who had developed multidrug-resistant tuberculosis (MDR-TB), a form of the disease that is often incurable in developing

countries because treatment costs can skyrocket to more than US \$200,000. MDR-TB is caused by partial or inconsistent treatment that allows the TB germs to develop resistance to the most commonly prescribed anti-TB drugs.

Stories like Bernado's, though, are rare in Nicaragua today because the country uses DOTS as a cornerstone in curing existing cases, controlling

the disease, and preventing multidrug-resistant strains from emerging, says Dr Jose Ramon Cruz, 46, Director of the Tuberculosis Control Programme.

Keeping treatment on track

An inexpensive management strategy that, in 1998, is being used in more than 96 countries, DOTS follows a patient through every step of treatment to ensure high cure rates and low default rates. A standardized recording and reporting system is an important pillar of the DOTS strategy because it rigorously monitors the progress being made in treating and curing each TB patient. Through analysis of these reports, health services can also quickly intervene with additional support and training if each administrative district is not achieving 85 percent cure rates or higher.

Dressed in a collarless doctor's smock, white slacks and new LA Gear sneakers, Lenin Gaitan Sandino, a nurse at the San Manuel Morales Health Center, is busy keeping track of the 38 TB patients logged in so far this year. The DOTS registry system enables him to confirm at a glance which people suspected of having TB have completed the three required sputum tests, and which still need to be tested. The log books are also a testament to the medical success of DOTS. The results of periodic sputum tests are charted beside each patient's name. Red plus signs, indicating infectious TB, quickly turn to blue minus signs, indicating successful treatment.

Providing an early warning system

Twenty-year-old Candida Hernandez is one of the few people in the log book whose test results have not shown treatment success. The young mother began treatment several months ago after



NTP Director Jose Ramon Cruz and his staff are the backbone of a successful management strategy like DOTS.

Despite socio-economic problems Nicaragua faces, the country is committed to providing its citizens with effective TB care

testing positive for infectious tuberculosis. She quit two months later after her mother, also sick with tuberculosis, consulted a local healer who told the woman her sickness was the result of a curse. The healer advised Candida to stop taking the anti-TB drugs and take herbal medicines instead. Candida has since come back for treatment and Sandino worries that she could become resistant to the TB drugs if she doesn't complete her entire treatment. Sandino says he will go out and talk to Candida's mother and persuade her to come in for treatment as well.

"Our goal is to cure the patient," he says. "To do that we have to make sure they take all their drugs and complete treatment. If they don't, they could become chronic. If they become chronic, then their germs will become resistant. And if this happens, most will die. Even worse, they will infect many of their family or friends with resistant germs."

While industrialized nations have medications and treatments that can often cure these destructive strains of tuberculosis, Cruz admits most developing countries simply can't afford them as they are nearly a hundred times more expensive than regular anti-TB medicines. "We don't have the budget to buy the more expensive second- or third- line drugs that can possibly save their lives," he says. "Sadly, that is what happened to Bernardo in Bluefields."

Cruz says he understands the enormous responsibility that rests with his staff and with the DOTS programme. "We use DOTS to ensure patients are cured and avoid creating multidrug-resistant patients in the first place," he says. "There is no alternative."



Monitoring patient progress at regular intervals is an integral part of effective TB control.

NICARAGUA

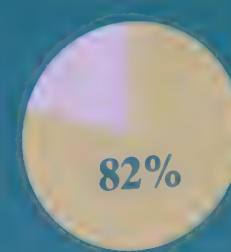
The treatment strategy which became known as DOTS in 1993, was implemented in Nicaragua beginning in 1984, with full country coverage by 1988. Initially, the national TB programme (NTP) received technical assistance from the International Union Against Tuberculosis and Lung Disease (IUATLD) and donor support from the Norwegian Heart and Lung Association.

Today, the programme has achieved wide coverage in the general health services and has organized the country's laboratory services to improve diagnosis. The Government of Nicaragua is politically committed to TB control, and provides a regular anti-TB drug supply to the NTP.

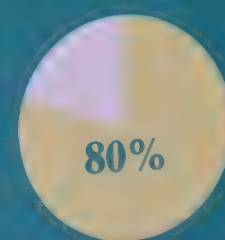
The NTP is known for its extensive training of staff in order to effectively implement and supervise the recording and monitoring system. The IUATLD, the Ministry of Health and the Pan American Health Organization (PAHO) support an annual international TB control course in

Nicaragua, training dozens of control programme staff from countries throughout the Americas.

The major challenge for the NTP is maintaining government support of the programme in spite of the socio-economic problems the country faces. These problems may hinder the maintenance of the previously strong health services system that provided a foundation for the TB control programme.



Infectious Cases Detected by DOTS (1996)



DOTS Treatment Success (1995)

extending lives

"We will pay a huge social and economic price if we ignore the HIV/TB co-epidemic. The young people who are dying are part of our community."

A strategy of hope for AIDS patients with TB

"I just don't see why I can't take the pills home," laments 28-year-old Fernando, a handsome Portuguese youth with lively blue eyes. His gold watch dangles loosely from his wrist and when he waves his hands to emphasize a point in the conversation, it rattles against the doctor's desk. Fernando is not happy about having to come to the health clinic every morning to take his TB medicine.

Dr Antonio Salema jokes with him like an old friend. "You know you have to come in if you want to stay healthy," he chides his young patient who is part of an often overlooked and vulnerable subgroup of TB patients. Fernando is young and he is HIV-positive.

"DOTS is our biggest ally in treating TB patients with HIV," says Salema after Fernando has

left his office. "TB is a killer in populations with HIV and AIDS. It wipes them out, sometimes within two or three months. The DOTS monitoring system gives us an opportunity to have daily interaction with these high-risk patients and helps us develop relationships with them."

Reaching vulnerable groups

Dr Maria Antunes, the Head of TB Control and Respiratory Diseases at the Directorate-General of Health in Portugal, knows just how critical it is to have DOTS in place. "DOTS is a proven and effective strategy to control and treat TB, even in people who are HIV-positive," she says. "One of the groups we concentrate our efforts on are TB/HIV patients. They are perhaps the most vulnerable patient group we have in Portugal."

In 1995, an estimated 6 percent of TB cases in Portugal were co-infected with HIV. By 1996, that number had risen to 8 percent. The gravity of combined TB and HIV epidemics is something that impacts on health care systems around the world. But the DOTS strategy gives health services a mechanism to combat the co-epidemics.

"The problem isn't only TB," she says. "The problem is that many of the people with HIV and AIDS lead non-traditional lives. For example, they can be intravenous drug users with no permanent home, or prostitutes who move around a lot. With the DOTS strategy, we can follow their treatment more closely."

Casal Ventoso, "home of the winds," is a shantytown that sits in a narrow gully outside downtown Lisbon, locked

DOTS can reach neglected groups like these immigrant children from the 6th of May slum in Lisbon.



PORTUGAL

between a busy highway and a steep hillside. Cordoned off behind a chainlink fence that is torn with swirled holes, stand more than 20 wooden shacks and camping tents.

On a warm, late winter afternoon, a dozen young people sit outside on the ground injecting themselves with heroin. Clear plastic syringes reflect the sunlight. On the shoulder of the highway beyond the fence, teenage girls hold out their thumbs, selling themselves for money to buy the next fix. Here, HIV finds new hosts and is carried through bloodstreams by shared needles and unprotected sex.

Dr Miguel Villar, director of a local health clinic, is familiar with the area and walks along the fence peering in. His normally loud voice drops to a sombre hush when he talks about Casal Ventoso. "TB loves areas like this," he comments, kicking empty syringe bubble packs from a recent government needle exchange. "Most of these kids probably have HIV. They are malnourished and live cramped together in small houses."

Maintaining contact is a priority

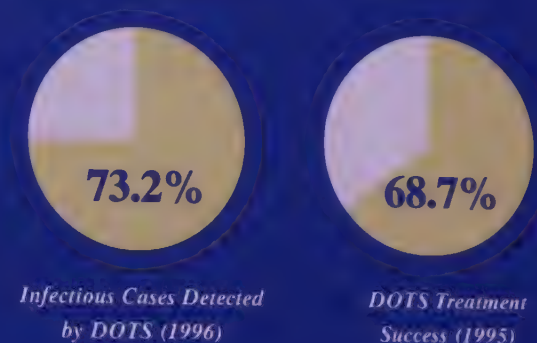
DOTS, he says, is one of the few hopes Portugal has in treating TB and slowing its spread beyond these communities. These kids, Villar says, have so many other worries that doctors can't expect them to bother showing up for treatment or remembering to take their medicine. "DOTS is one of the few ways to reach them," he adds. "The nice thing about it is that we can depend on community volunteers to help us supervise patients taking their

Short-course chemotherapy under direct observation, which later became a central element of the DOTS strategy, was first introduced in Portugal in 1979 through a project with the International Union against Tuberculosis and Lung Disease (IUATLD). At that time the programme was disseminated throughout the country through the national Servico de Luta anti-Tuberculosa. Today, tuberculosis control is maintained entirely by the Ministry of Health without donor agency support.

Government commitment is one of the strongest aspects of the DOTS programme and all TB control activities are fully funded, from diagnostic facilities to treatment and prophylactic activities. The Ministry ensures a dependable supply of anti-TB drugs, even expensive second-line regimens for multidrug-resistant TB. Over the last few years, the programme has seen a reduction in transmission of TB, particularly in children.

The greatest challenge facing the NTP is the HIV/TB co-epidemics, especially among intravenous drug-abusers and prison inmates. Case management of

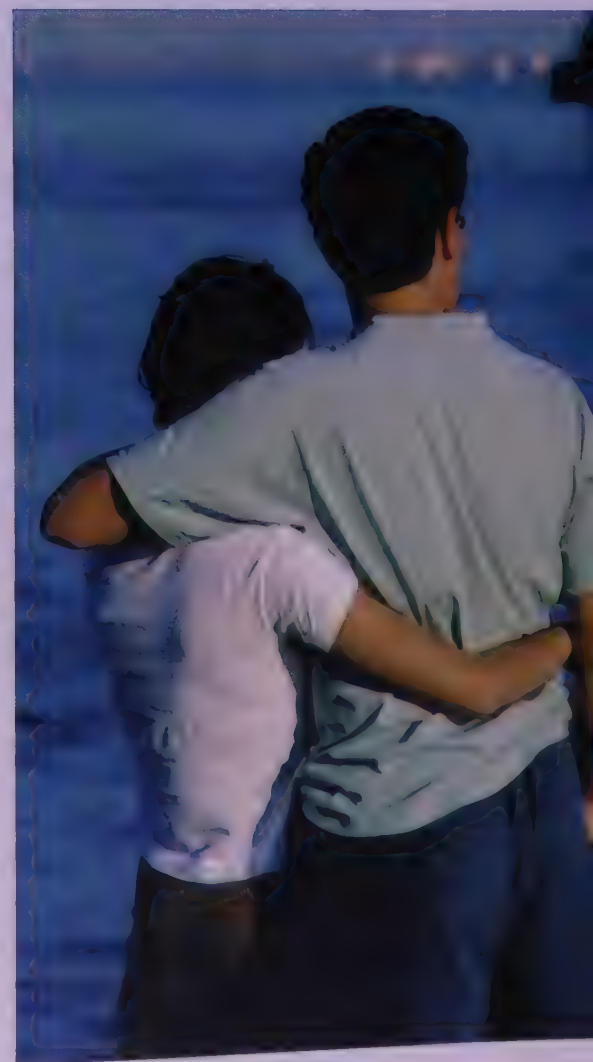
intravenous drug users has been particularly difficult because of the transitory nature of this population. To overcome the problems facing these two groups, the Directorate-General of Health and the Directorate-General of Prisons and the National Service for the Prevention and Treatment of Drug-addiction signed joint protocols in early 1998. An immediate challenge is better integration of TB control services in the existing community health services.



medicines. We have to look at more community solutions, because TB and HIV affect everyone."

Back in her office, Antunes agrees with Villar. "We will pay a huge social and economic price if we ignore the HIV/TB co-epidemics," she says. Because of the success of DOTS in treating TB, Antunes says, the government is starting to experiment with combining the supervised TB treatment with needle-exchange programmes to help slow the spread of HIV. "We know that DOTS works and we have to make sure we are using it as much as possible in places like Casal Ventoso. The young people who are dying are part of our community."

At least 50 percent of HIV patients in Portugal are co-infected with TB.



a world-wide solution

"Success is within the grasp of any developing nation. Too often, these countries are given up as lost causes when in fact, they can be examples of innovation."

'Small wins' build momentum for TB control success

Willpower and commitment are pivotal to any country's success, says TB Programme Manager Dr Oumou Bah-Sow.



Guinea, a forested country in West Africa only slightly smaller than the United Kingdom, shares a typical profile with many developing nations. Most of its 7 million citizens live scattered in rural villages throughout the interior and depend largely on subsistence farming. Life expectancy hovers around 44 years. In 1995, the total GNP per capita was US \$590.

Some believe that what sets Guinea apart from other developing nations is the

country's success in combating TB. Yet, the Manager of the National TB Programme is a firm believer that Guinea's success is not unique, but rather evidence that any country can implement effective control programmes using the DOTS strategy.

"Success is within the grasp of any developing nation. Too often, these countries are given up as lost causes when in fact, they can be examples of innovation," says Dr Oumou Bah-Sow, who set up the national TB programme in Guinea. "I think any country has to start with willpower. You have to have a commitment from the government to make TB a public health priority." Once that is in place, Bah-Sow says, it is just a matter of setting a steady pace and taking one step at a time to expand DOTS countrywide.

GUINEA

In 1990, Guinea began implementing a five-year TB control plan based on the DOTS treatment strategy. By 1995, the National Tuberculosis Programme (NTP) was successful in integrating TB control into the 33 existing prefectures, or districts. This decentralization and integration into basic health services was essential for a country with scarce health care resources. The case detection rate doubled between 1990 and 1994.

The government has shown strong commitment to TB control and its Ministry of Health has provided the programme with a regular drug supply. There also exists a strong, efficient central unit to deal with TB. National TB control guidelines have been developed and training of staff takes place at national, regional and district levels. There is regular supervision of prefecture (district) activities, however the programme will need to strengthen staff and activities at the regional level.

Guinea's key success is that it is a self-sustaining TB control programme with a consistently high treatment success rate. The government and leprosy and TB NGOs share responsibility for financing the programme and ensuring its managerial capacity. Because of this, a secure drug supply is a hallmark of the programme.

In the future, donor support will be critical to ensure full integration of TB services at the commune level in 145 health centres. Another challenge is to expand health coverage in remote rural areas.



Infection Cases Detected by DOTS (1996)



DOTS Treatment Success (1998)

One goal at a time

Guinea's TB programme is evidence that small successes can build enormous momentum and keep a programme on track during its developmental stage.

One of the first challenges facing the programme was a lack of drugs. By the late 1980s, however, the ministry of health showed its political commitment to the programme and secured a regular supply of anti-TB drugs. It seemed like a small win at the time. But, says Bah-Sow, it was the turning point. "Once we knew we had the drugs, we requested a consultation with the World Health Organization to design a plan of attack," Bah-Sow says.

In 1990, WHO assisted Bah-Sow and government leaders in developing a five-year plan based on the DOTS management

strategy. Despite scarce health care resources, the TB programme was able to integrate TB control into primary health care clinics. "Decentralization and integration into basic health services was critical," Bah-Sow says. "Seventy-three percent of our population lives in rural areas. If you want to take care of them, you have to bring health care to them."

The TB control effort started small, Bah-Sow says. "In 1989 we had only two clinics where patients could be diagnosed and receive treatment. One was the hospital in Conakry, the other was a clinic in Macenta." The TB center made plans to expand the DOTS programme to six prefectures-political districts-every year. By 1995, each of 33 existing districts was covered.

The next win for the programme was significant. Along with concentrating efforts at integrating TB control, Guinea also established a network of laboratories for research and testing. In 1989, there were only 15 laboratories in the country. By 1995, there were 67. The most impressive is the National Mycobacteria Reference Laboratory that sits adjacent to the TB ward at the Ignace Dean Hospital. Built by the government with help from WHO and equipped with assistance from Cooperation Francaise and the Raoul Follereau Association, the modern, but simple, laboratory was completed in 1996.

"The original laboratory was just a microscope at a TB clinic near the port," Bah-Sow says. "Here we have a fluorescent microscope, autoclaves, safety cabinets for protecting workers, a warm room to grow cultures and a refrigerated storage area to keep prepared cultures." The lab is staffed by two doctors, six technicians and three nurses. It also doubles as an educational facility and trains more than 100 technicians a year.

Within any country's reach

Guinea's commitment to TB control has paid off in only a few years. "Our case detection



Guinea's case detection rate doubled over a five-year period. The programme now reaches more TB patients before they have a chance to infect others.

rate doubled and our treatment success rate has increased from 71 percent in 1990 to 78 percent in 1995," Bah-Sow says. "At the same time the proportion of smear-positive TB cases who defaulted during treatment has decreased from 20 percent to 10 percent."

This drop in number of defaulters is another example of the programme's innovation. A retired social worker riding a motor-scooter visits patients in their homes, motivating them to continue their treatment until cured.

Bah-Sow offers this advice to countries or governments that believe effective TB control is beyond their reach. "Try a demonstration area to show the people that it works and build their confidence. All that's needed after that is patience, faith and hard work."



patient trust

"I knew about the symptoms of tuberculosis. I also knew that in Vietnam we have DOTS. So when I noticed the symptoms, I went for treatment."

Community education leads to early diagnosis, confidence in DOTS

Highway 18 in Vietnam's Quang Ninh Province is a road of contrasts. Rising on one side are the dramatic karst formations that endow the nearby bay with its stunning beauty. Slicing northward along the other is a long range of sinewy mountains whose rugged slopes are deeply scarred by decades of coal mining.



A well-informed TB patient, Tran Van Thanh (right) knew that DOTS would cure him.

Quang Ninh Province produces 90 percent of Vietnam's coal, and it is in and around these mines that Tran Van Thanh has spent most of his life. Now 70 years old, Thanh retired from his position as director of a local coal mining company in 1984. Today he lives in a comfortable two-room house on the outskirts of Cam Pha, a small,

well-kept provincial town of 140,000 people, 50 percent of whom work in the mines.

Because he lives in a region where lung diseases such as silicosis and tuberculosis are major health problems, Thanh was not too surprised a few months ago when he developed a cough. But the chest pain, slight fever, and weight loss alerted him to the possibility that he might have tuberculosis.

Well-informed patients

"I knew about the symptoms of tuberculosis because I had read about it in the newspaper and heard about it on television and on the radio," he says. "The health care staff at the commune had also given me a brochure about the symptoms. I also knew that in Vietnam we have a new national programme for tuberculosis—DOTS. So when I noticed the symptoms, I went for treatment."

The district hospital diagnosed Thanh with pulmonary tuberculosis. He spent two months in the hospital for an intensive phase of treatment, and is now in his third month of treatment at home. Thanh says that he feels much better, but he knows that he must continue his daily treatment to get completely back to normal.

"The health care worker from the commune comes. She counts the pills to make sure that I am taking them correctly. Treatment for me has been good," says Thanh as he leans back in his chair and smiles proudly. "I believe that I will be cured." As Thanh is speaking, the health care worker from his commune, Madame Le Truong Thi, enters the room and takes a seat. She begins counting Thanh's pills, which are on the table in front of her.

An alert, straightforward woman in her early 40s, Madame Thi is an assistant physician

and chief of the communal health station. She has been working at the health station for 21 years and is responsible for all TB cases in the commune.

There are sixteen communes in the 381-square kilometer Cam Pha district, and each commune has a health care station with a general health care worker trained in TB control. Thirteen communes have a medical doctor on staff and three have an assistant physician like Madame Thi. On her lap, Madame Thi holds a bright, colorful folder that says in large type, 'Think about TB when you have these symptoms...'

A focus on the community

"This is a poor community, so there's not much money to spend on health care," says Madame Thi. "People work at various jobs, like turning seawater into salt, making bricks, or fishing. A lot of people work in the mine. And, we have a lot of lung diseases here, including TB.

"But TB is not a serious problem if it's detected early and patients comply with the treatment. We try to educate the people, and, when we find a suspected case, we send the person to the district hospital for diagnosis."

DOTS became the standard treatment regimen in the Cam Pha district in 1993 and all tuberculosis patients are now treated through the programme. "DOTS is much better than the previous treatment," says Madame Thi. "Before we implemented the DOTS strategy, our cure rate was very low, sometimes only 30 percent. Twenty percent of the patients never completed treatment. But with



Lung diseases are a major health problem in Quang Ninh Province, Vietnam.

DOTS, we now have an 83 percent cure rate and only five percent of the patients fail to complete treatment. So, DOTS gives very good results."

Madame Thi believes educating patients has been instrumental to the programme's success. "It's not surprising that our cure rates are up," she says. "By educating the community and earning patients' trust, they learn that a cure is possible."

VIETNAM

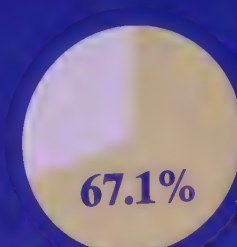
TB control activities have been in place in Vietnam since 1985, with gradual implementation. From the onset of the national TB programme, the Medical Committee Netherlands Vietnam (MCNV), a Dutch NGO, has supplied material and financial support. The Royal Netherlands Tuberculosis Association (KNCV) provides technical assistance. The Government of The Netherlands has donated approximately US \$3 million to Vietnam to implement a national TB control plan.

Following a World Bank study in 1995, the National Health Support Project (NHSP) was formulated. The project is financed jointly by the Governments of Vietnam, Sweden and The Netherlands. The project's guaranteed financing of US \$23.4 million through 2002 creates a stable environment for expansion of DOTS.

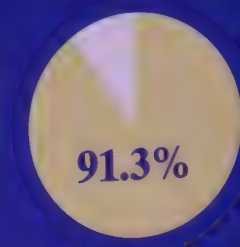
By declaring tuberculosis a priority, the government has shown its commitment to TB control activities. The strong infrastructure of the general health care services and high quality staff also contribute to the success of DOTS in Vietnam. The programme plans to

further develop management skills of staff at national, provincial and district levels, with support from the Government of The Netherlands. Technical inputs for the training programme will be provided by the International Union Against Tuberculosis and Lung Disease (IUATLD), WHO and KNCV.

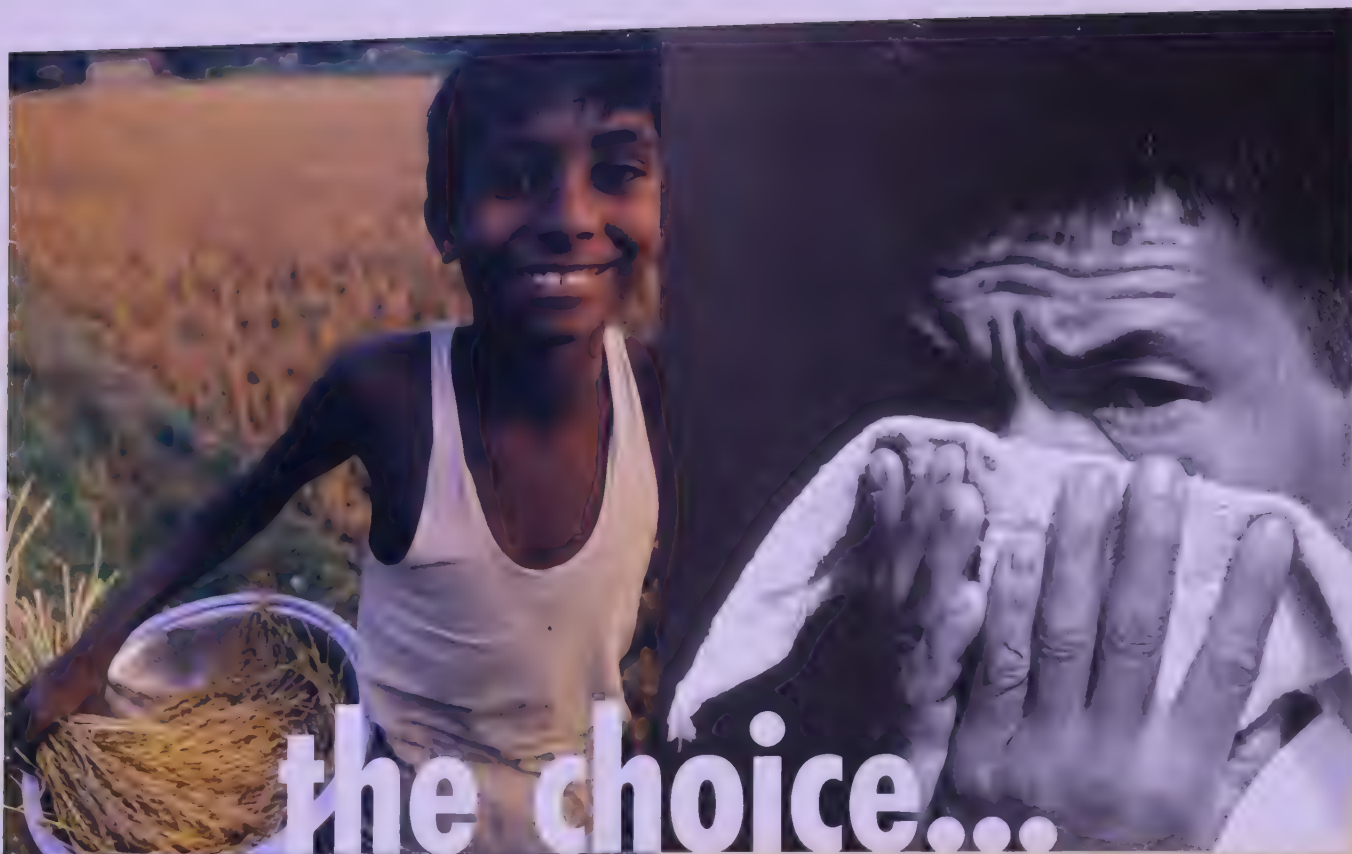
Future challenges include TB control for urban populations (homeless, less privileged, unregistered inhabitants), increased private sector collaboration, legislation to control the quality and provision of anti-TB drugs by private pharmacies, and the threat of HIV/TB co-infection.



Infectious Cases Detected by DOTS (1996)



DOTS Treatment Success (1995)



Countries face grim consequences if they are slow in implementing and sustaining effective TB control programmes.

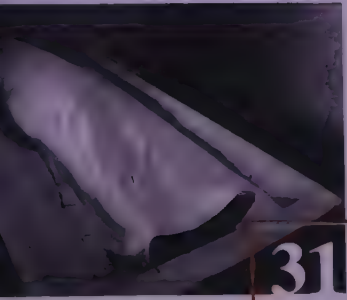
This creates a frightening backdrop to the fight against the epidemic and continues to exacerbate TB's impact on the world.

...is ours.



28

Drug-resistant TB, more difficult and expensive to treat, has emerged in 'hot zones' around the world.



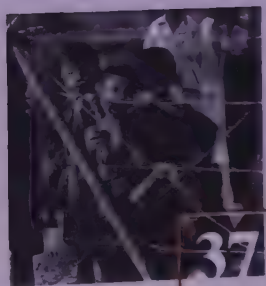
31

This year, more people will die of TB than in any other year in history.

the price of inaction



TB kills more women than any single cause of maternal mortality.

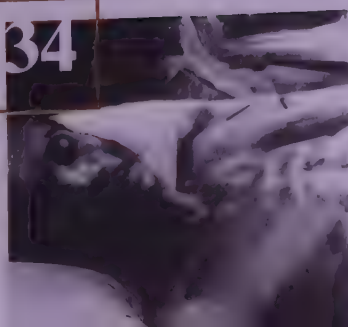


37

As many as 50 percent of the world's refugees may be infected with TB.

One-third of the increase in the incidence of TB in the last five years can be attributed to HIV.

34



Drug resistance thrives on sloppy drug use

Goga is not a physician or a health care worker of any kind. He is an economics student with no medical training who freely dispenses drugs and makes diagnoses from a makeshift "pharmacy" in a bustling market in the former Soviet republic of Georgia. His wares include everything from transfusion kits to syringes to anti-TB drugs.

"The official pharmacies have to pay taxes, rent and so on, so their prices are two times higher," says Goga, who declined to give his full name when interviewed by Newsday journalist Laurie Garrett for her series on deteriorating health care systems in the former Soviet Union. "I also have a much greater supply of drugs here and no drug lays on the table for more than two days."

Yet, his so-called patients will not be cured by taking the TB drugs he has sold them. Instead, his illegal enterprise illustrates a bitter irony in tuberculosis control today—the very drugs

designed to cure TB can actually worsen the epidemic. Inappropriate treatment regimens, self-medication with powerful anti-TB drugs, the proliferation of inferior drugs, and interruptions in patient treatment all give TB bacilli the opportunity to become resistant to one or more drugs over time, making the disease more difficult and expensive to cure. These patients then go on to infect others, creating a vicious cycle of drug resistance.

Inappropriate treatment regimens

The widespread disparity in length of treatment and the combination of drugs prescribed results in ineffective treatment regimens that are failing to cure patients. For example, one survey in India found that 100 private doctors prescribed 80 different regimens, most of which

were excessive and expensive. Another study showed that 80 percent of private practitioners surveyed in Pakistan prescribed unnecessary long-duration chemotherapy, and that 31 percent of patients were still ill more than three years later.

Over-the-counter availability

More than 80 percent of the anti-TB drugs in the world are available through pharmacies, making it extremely difficult to control their distribution. One only has to visit a corner drugstore in India, Mexico, Thailand and a multitude of other countries to obtain powerful TB medications over the counter (OTC).

The ease in purchasing these drugs has led to self-medication by patients and increased black-market

distribution by persons with no medical training, like Goga.

The problem is so severe that some health workers are speaking out. In Karachi, Pakistan, a group of chest physicians representing several medical societies recently demanded that the government ban the OTC-sale of anti-TB drugs and make the state solely responsible for the provision of these medicines. But because of the strong vested interests of some pharmaceutical



companies and private practitioners, only a handful of countries, such as Morocco, Chile, Oman and Brazil, have been able to regulate the sale of these drugs.

Inferior drugs

Few regulations exist that require pharmaceutical companies to ensure the quality of the drugs they produce and market, which

has led to the proliferation of sub-standard and counterfeit TB drugs in some countries. For

"Once drug resistance develops, TB bacilli become virtually impossible to kill."

example, an imitation version of the common anti-TB drug rifampicin, bearing the label of a manufacturer in a nearby country, was circulated throughout provinces of Vietnam last year. In August 1997, the Inspection Institute of Saigon issued a warning about the product and asked health officials to tighten control over their distribution systems to stop the circulation of the counterfeit drug.

Erratic drug supplies

Erratic drug supplies—caused by government and TB programme bureaucracy and inefficiency, inadequate funds for drugs, and ineffective distribution systems—dangerously cut patients off from their treatment. Cure rates are jeopardized unless a guaranteed drug supply exists, which enables the patient to finish an entire course of treatment. For example, Indonesia faces the danger of drug shortages in some districts and a lack of buffer stocks in others because reporting of TB cases is not accurate and drugs are distributed without

knowing existing stocks at district level.

While no quick solutions exist that can address all of these problems, the DOTS strategy works to ensure that drugs are part of the cure, not the problem. This tested and proven strategy includes six to eight months of short-course chemotherapy using a standardized combination of powerful anti-TB drugs. Patients are observed taking their medication by a health worker or trained volunteer, and their progress is accurately monitored to ensure they finish an entire course of treatment and are cured. The strategy also emphasizes

"Multidrug-resistant TB is often fatal, and up to 100 times more expensive to treat."

the political and financial commitment needed to ensure a dependable drug supply for TB programmes. A greater challenge is for governments and those in TB control to come together to address regulation of the quality of the drugs that these programmes rely upon.



Stigma sends TB epidemic underground

For Bobby Cabenegro, walking just 100 meters seems like "playing one day of basketball." This young Filipino man is unable to attend school or hold a job, and can barely manage to climb a flight of stairs. Diagnosed with TB at age 15, he has started and stopped treatment several times, often in denial about his disease or convinced he could not be cured. He now suffers from a drug-resistant form of tuberculosis and has little hope for recovery.

Yet, Bobby's friends and classmates in Manila do not know he has TB. Instead he has told them that he has cancer because it is "socially more acceptable to have cancer than TB in the

Philippines," he says.

Spurned by their friends or communities, and often stigmatized by society, TB patients endure more than just the

physical symptoms of the disease. The rejection many TB patients feel adds emotional suffering that often prevents them from seeking the treatment they need or completing treatment once it is begun.

Lack of knowledge fuels fears

The stigma of TB is powerful because the public's fear of infectious disease is so strong. Lack of knowledge about TB only fuels this fear. Many people are not aware that TB is curable. They don't understand that those infected with the TB bacillus are not contagious until they develop active TB, or that most infectious patients are not contagious after the first few weeks of treatment with DOTS. There is not an understanding that TB sufferers can go on to lead healthy, productive lives.

Without increased education on TB and its cure, control efforts will be

hampered and there will be no end to the emotional burden that TB sufferers bear in almost all cultures and regions of the world.

For example, in the four-storied Ramesh Kilachand Hospital in Sewree, India, the windows are fitted with iron grills as a precautionary measure against the high rate of patient suicide. TB sufferers are often considered a burden on the family and rejected by friends and loved ones. When they are left at the hospital for treatment, family members give false addresses so they will not have to claim the body once a TB patient has died. One patient lamented, "We are sure that our relatives will disown us sooner or later, and our bodies will be disposed of as lawaaris (one who has no heirs)."

Women in India are particularly vulnerable to TB's stigma. A study there found that married women who have contracted infectious TB are reluctant to tell their husbands for fear of divorce or abandonment. As a result, they often seek treatment later and with more advanced disease. By delaying treatment, they jeopardize their chances for survival and may infect family members, friends and co-workers—an average

of 10 to 15 persons within a year. Once sick with TB, daughters often have little chance of marriage because of TB's powerful "label" declaring them unfit to be wives.

"Fearing divorce or abandonment, some married women with TB are reluctant to seek treatment."

In many African societies, TB already carries its own stigma but the association with HIV has magnified it. Some patients choose not to go to health facilities for fear of being diagnosed with TB and consequently being presumed to also have HIV. In urban Lusaka, people already distinguish two distinct "types" of TB—the traditional disease, and one that is associated with HIV and referred to as "TB of the bones." Many

believe that such "TB of the bones" cannot be cured by health centers and many patients go instead to traditional healers.

TB exacts a high emotional toll

Even in countries that have access to the most sophisticated TB treatment methods available, the disease exacts a high emotional toll.

In 1995, two London hospitals experienced a serious outbreak of multidrug-resistant TB and several people were infected. Paul Mayho was in the hospital with gastrointestinal problems for only a week, but it was long enough for him to contract MDR-TB.

Mayho, who is HIV-positive, was one of the few to survive. His treatment included three months of isolation in a three-by-four meter room at a London hospital. "My job and my freedom were gone. The next things to go were my partner and my home," Mayho said in a newspaper interview last year. "I felt completely dehumanized, more like a disease because that is how people treated me."

Old friends who are HIV-positive shun him even though he is no longer infectious. "They are frightened by the disease. It's very lonely. I find myself having to deal with prejudice, fear and misunderstanding. They used to say to people with AIDS, 'You are not alone.' Multidrug-resistant tuberculosis is a different story."



TB death sentence given to prisoners and communities

health staff and the general population as well.

Prison amnesty programmes have released thousands of sick prisoners into communities ill-equipped to handle the burden of this disease. The Russian Research Institute on Pulmonary Tuberculosis (RRIPT) estimates that up to 13,000 prisoners with TB are released into communities every year and only 7,000-8,000 seek treatment. With

An estimated one in seven inmates at one Russian prison will be given a death sentence in 1998, but not for any crimes they have committed.

These inmates have been sentenced to death by tuberculosis as prisons and corrective labor colonies become literal incubators of the disease. Filth, squalor, overcrowded conditions, malnutrition, and lack of drugs all contribute to a horrifying statistic: an estimated 50 percent of Russia's one million prison inmates are infected with the TB bacillus, and close to 10 percent are sick with active TB. Many of these sick inmates are then sent to isolated prison colonies in a futile attempt to contain the spread of the disease.

Sasha, a petty thief sentenced to three years in jail, met his death at age 21 while at Special Anti-Tuberculosis Colony No. 10 in Varnavino, a remote village in Russia's Nizhny Novgorod region. Designed

originally to house 1,000 sick inmates sent from other penal colonies, the actual convict population is over 2,000. During 1996, 88 inmates died from TB at Colony No. 10. More than 150 prisoners, including Sasha, died from TB in the first nine months of 1997, and more than 280 are expected to perish from the disease in 1998.

'The last stop before the afterworld'

An estimated 50,000 TB patients are confined in 45 such colonies in Russia alone. The Sunday Times of London documented the tragedy first-hand. In an interview with Times correspondent Mark Franchetti, the director of the Varnavino camp described the colony as "the last stop before the afterworld. Our courts condemn inmates to a prison sentence. But once they catch TB and are sent here, it's a death sentence they are facing."

The original purpose of isolating prisoners



with TB was to reduce the risk of contagion. The bitter irony is that prisons have become breeding grounds for a deadly disease that cannot be contained by prison walls, nor by isolating sick prisoners without providing proper treatment. The death sentence is now handed out to guards, prison

drastic cuts in public health funding, and only three

"Tuberculosis — a fact of life, and death, for many prisoners worldwide."

regions that have access to the DOTS strategy, Russia is not able to provide effective treatment for those who seek it. The rest, mainly

those who are left homeless, live in the streets and infect those around them.

TB thrives in prisons world-wide

Yet this "incubator" phenomenon is not restricted to Russia alone. Prisons have become a fertile breeding ground for TB and other diseases. Inmates and prison staff with infectious cases of TB spread the disease to an overcrowded population that has little to no access to effective TB care. Examples of this tragedy can be found around the world:

- Azerbaijan's prisons are thought to house more than 4,600 TB cases per 100,000 inmate population, a 47 percent higher prevalence rate than in the general population. It is estimated that TB is responsible for up to 80 percent of all deaths in Azeri prisons.

- An estimated 17,000 out of 76,000 inmates in Kazakhstan prisons are thought to have TB. When 30,000 inmates were released by the government of Kazakhstan in 1996 as a way of easing overcrowded prisons, human rights organizations warned that close to half of the inmates were ill, many with tuberculosis.

- In Cambodia, the acute lack of medical facilities leaves the prison system rife for the unabated spread of communicable diseases. According to

Moung Sam Ath, a warden at the Takhmao prison, tuberculosis is "just a fact of life for both prisoners and guards."

Compounding the tragedy in prisons is that they are perfect environments to produce deadlier, multidrug-resistant strains of TB (MDR-TB). Most prisoners do not receive proper medical treatment.

Inconsistent drug supplies and drugs of poor quality have led to strains of TB that are resistant to two or more drugs. Prisoners with MDR-TB then enter communities where they infect the population with a form of the disease that is virtually incurable.

The final chapter of this tragedy is that many prisoners with TB refuse treatment, and some non-infected prisoners actually try to acquire tuberculosis. In Russia, "to sell a bread crumb" refers to the practice of eating a TB patient's dried sputum in order to infect oneself. These prisoners cling to a hope that they will receive better rations, will not have to

work and will be transferred to less-crowded living conditions. The thousands of prisoners who will die from TB, like Sasha, know a very different fate awaits.



TB's 'ripple' effect devastates families

According to his family, Hussain Saheb, a 45-year-old

Indian, was a healthy, strong and hardworking man.

When Saheb developed a persistent cough, he neglected it, believing it to be a result of his chain smoking.

The cough continued. Saheb grew weaker and couldn't work. Three months later, he began to spit up blood. His family members consulted a local traditional healer who assured them that Saheb would be cured. Four months later, after no improvement, Saheb sought help from a private practitioner who diagnosed him with TB.

Before he died, Saheb had started and stopped treatment several times, spending

money for drugs, doctors' fees, transportation and even bribes to hospital nurses to ensure adequate care.

His widow, Alam, said her family spent more than US \$430 on her husband's illness, an amount

twice that of the average yearly salary of an unskilled laborer in India. She is now burdened with a loan. Months later, only 50 percent of the debt had been repaid.

"The loss of mothers and wives has enormous impact on the fabric of family life."

TB's many casualties

Clearly, TB's devastation to society goes beyond the two to three million who die from the disease each year. Among its casualties are the families and communities that suffer severe economic and social repercussions long after a TB patient has died.

Although TB takes its toll primarily among



people in their most productive wage-earning years, this disease has lasting impact on children and families, particularly in developing countries. With the onset of illness in the family, a vicious ripple effect begins.

First, cash income is lost when the wage earner is too ill to work. In Zambia, an average of five dependants are supported in the household by the main income earner, making the loss of wages an immediate and powerful hardship for the family.

Next, capital is lost as the family sells animals, land and investments to pay for healers, medicines and hospital bills. As Saheb's story illustrates, direct costs to seek diagnosis and undergo treatment can quickly add up to the average annual income

in a developing country. Because of these enormous costs, a patient may default on treatment to return to work, and may end up infecting other family members.

Land productivity is lost as the family turns to crops that require less intensive farming—but these are usually less valuable nutritionally and economically, and only add to the financial devastation these families experience.

The end result is that families quickly become impoverished. A self-sustaining and economically viable household can become permanently destitute. In Nepal, there are stories of young widows with no income and

no prospects for another marriage turning to prostitution to support the family.

Women and children are not immune

TB also kills nearly 1 million women each year, more than any single cause of maternal mortality. The loss of mothers and wives has enormous negative impact on the social fabric of families. Children are often left destitute or orphaned.

This cost to children is often overlooked when describing TB's impact. Children go hungry when their sick parents cannot provide for them, and they may not receive care when they themselves fall ill. Close to

"TB's cost to children is often overlooked, particularly in developing countries."

100,000 children die from TB each year. Educational investment for the future is also lost as elder children, especially girls,

are taken out of school to care for sick family members. Children from poor households are also vulnerable to being pushed out as "substitute workers."

Yet TB's economic impact extends beyond the family and into the community and the country. In India alone, the loss to the economy is estimated to be at least \$372 million each year. TB

continues to fuel poverty, but the irony is that poverty itself leads to increased risk of TB infection and disease. Poor nutrition affects the immune system's ability to fight infection, allowing it to develop into open disease. Poor housing can increase infection rates through overcrowded, squalid conditions. Low incomes mean that the effective TB treatment available is not an option for families who are unable to pay for drugs, hospitalization, or travel to and from health care facilities.

The irony in Hussein Saheb's story is that there exists a proven and inexpensive treatment strategy—DOTS. A six-month supply of drugs for DOTS costs less than US \$25 in many parts of the world. A World Bank report cited DOTS as one of the most cost-effective health interventions available—a sound economic choice as governments and donors consider the best buy for their health care dollar.

Yet, only 15 percent of all people with infectious TB are currently being treated by DOTS despite all the evidence that this strategy saves lives and prevents the continued spread of infection. Without expansion of effective control programmes, the economic and social costs of TB will increase with every life lost.

All across Africa, the coffin makers do brisk business outside city hospitals, capitalizing on the surge in deaths as the devastation of the TB/HIV co-epidemics surpass the devastation of either disease on its own.

Because each speeds the progress of the other, the alliance between TB and HIV has had the greatest impact in regions of the world where the two infections are on the increase, particularly Africa and Asia.

Their partnership and devastation are based in science. HIV—the human immunodeficiency virus that causes AIDS—weakens a person's immune system. For someone who is also infected with TB, this can speed the progression to the active form of the disease. Someone who is HIV-positive and infected with TB is 30 times more likely to become sick with TB than someone infected with TB who is HIV-negative.

The global statistics associated with the co-epidemics are staggering. TB is now the leading cause of death among HIV-positive people and accounts for one-third of AIDS deaths world-wide, and up to 40 percent of AIDS deaths in Asia and Africa. It is estimated that by the end of the century, HIV infection will annually cause nearly 1.5 million cases of

HIV throws fuel on TB's fire

TB that otherwise would not have occurred.

When you calculate that nearly 31 million people world-wide were HIV-positive in 1997, and almost one-half were believed to be infected with TB, the implications for TB control are enormous.

Difficulties in diagnosis and treatment

The biological interaction between HIV and TB leads to fewer bacilli being coughed up in sputum so it is genuinely more difficult to diagnose TB in HIV-positive individuals. Furthermore, HIV causes several other pulmonary problems that may be misdiagnosed as TB. Despite the over-diagnosis seen in some settings, many patients are still found with untreated TB at autopsy, leading experts to believe that many HIV-related cases of TB are still not being detected.

Once TB is detected, treatment can pose its own unique problems. A commonly used anti-TB drug—thiacetazone—has been known to cause adverse

skin reactions and even death in HIV-positive patients.

Because almost 90 percent of those living with HIV do not know their status and TB can occur at early stages of HIV infection, it is still not possible to prevent these serious adverse reactions. This can lead to patients choosing not to take their medications and interrupting treatment.

An individual's or community's perception of the diseases can further complicate TB treatment. For example, the high mortality rate in HIV patients, even when it is not linked to TB, can lead to a community's loss of confidence in the TB programme's ability to cure TB. Many people do not want to know if they are infected with HIV or TB, thinking that infection surely means death and will only add anxiety and sadness.

Demands on overburdened health care systems

In developing countries, human and laboratory resources that were barely

adequate before the HIV epidemic are no longer able to support effective TB control efforts. For example, adequate tracing of treatment defaulters and sputum examinations at two, five and eight months are increasingly more difficult because of overstretched resources.

Crowded clinics and hospitals are now ideal settings for transmitting TB. The high prevalence of HIV among hospital patients and those visiting clinics facilitates the spread of TB because these patients—as well as HIV-positive health staff—may already be immuno-suppressed and highly susceptible to infection.

The increased burden of disease passing through health facilities has also led to staff dissatisfaction with working conditions, as evidenced by health care worker strikes in parts of Africa. Poor staff morale leads to deterioration in the interaction between patients and clinicians. The breakdown in communication, coupled with long waiting lines, results in patients seeking alternative care to government health services.

Dual problem, dual solution

The use of the DOTS treatment strategy for TB can have impact on the co-epidemics. Effective TB control can extend life for someone with HIV. It can also quickly make an individual non-infectious and reduce further spread of TB infection—especially critical in regions where HIV is rampant. This is especially critical to protecting health care staff who work in endemic areas.

"TB accounts for one-third of AIDS deaths world-wide."

Significant progress in controlling the co-epidemics, however, will require a concerted approach in the treatment and prevention of these diseases over many years. Priorities include promoting political commitment to address the dual epidemics, coordinating HIV and TB programmes,

developing models of integrated care, and conducting research to study the diagnosis, treatment and prevention of

TB in areas of high HIV prevalence.



Collapsed public health systems spawn TB bacilli

In Buryatia, a Russian republic, Ludmilla Yerbadaeva has toiled for 20 years in an unheated two-by-three meter "laboratory" without running water or modern equipment. There is no money for a proper microscope to view sputum samples, or gloves or facemasks for protection. She sews makeshift facemasks for herself from layers of gauze bandages.

Her sparse and inadequate lab in Buryatia is just

one example of how deteriorated public health care systems—hallmarked by deep cuts in government funding, haphazard health spending allocations, erratic drug supplies and weakened administration—are fertile ground for the TB epidemic. In many countries, rich and poor, the absence of an effective public health system means the TB epidemic poses a greater public health risk.

TB control fails in weakened systems

The dramatic social upheaval in the former Soviet republics and subsequent collapse of the government health care system are perhaps the clearest illustration of how this opportunistic killer thrives when a public health

structure collapses into a chaotic, weakened system of care.

Tuberculosis is now sweeping unchecked across much of the region. Overburdened, under-funded health care systems cannot ensure that patients are treated with the most effective drugs, in the right combination, and for the appropriate duration. TB patients are not cured, develop resistance to drugs and become chronic

cases. In turn, the public is exposed to strains of TB, stronger, deadlier, harder to treat than before. The reality: a public health system that fails to cure or protect its people.

Russia, for example, has one of the highest rates of TB in the industrialized world and drug-resistant TB is very high. Chronic shortages of supplies, dilapidated physical facilities and late payment of wages to health care workers hamper any efforts to control the disease. The country earmarks less than 2 percent of its annual budget for health care services, a tiny fraction of which goes to tuberculosis.

Systems world-wide have suffered

The former Soviet republics are not alone in feeling the effects of public health systems pinched by economic reforms. In many areas of the United States, public health infrastructures dismantled over the previous decade to help cities, counties and states balance their budgets gave rise to the resurgence of tuberculosis in the early 1990s.

Prior to the 1980s, public health budgets were ample. For example, New York City's budget for TB was close to US \$40 million in 1968. This shrank to just US \$4 million in 1988. Within 15 years, the number

of active TB cases tripled and the number of multidrug-resistant TB (MDR-TB) cases doubled. The epidemic caused more than a billion dollars in health care costs before DOTS was implemented and rapidly controlled the crisis.

China, which once boasted a state-controlled health system that strove for 'health for all,' is now experiencing a growing divide in access to care particularly between urban and rural areas. According to a World Bank report, China's dramatic improvements in health care since 1948 have begun to erode. The report titled *Financing Health Care*, part of the China 20/20 series prepared at the request of the People's Republic of China, stated that "if the country returns to a policy of vigor-

"Chronic shortages of supplies and sub-standard laboratories hamper TB control efforts."

ous finance and support for public health, it could meet the needs of current and future generations."

In South Africa, a 1996 report prepared by the Health

Systems Trust and commissioned by the Health Department questioned planning and funding for health policy, particularly "imbalances in provincial budget allocations." The report stated that a substantial number of clinics in the Northern and North West provinces, critical to providing adequate health care, were sorely lacking in basic services such as electricity and water. It called for the government to shift the burden away from main hospitals and toward more cost-effective and accessible clinics.

In New Zealand, the issue of public health funding

has been a talking point in government elections. In November 1997, one political party issued a public statement calling for a health referendum earmarking 7 percent of New Zealand's GDP for health spending (up from 5.7 percent) in order to ensure "a fully funded, secure and accountable public health system."

Many countries world-wide—rich and poor—may believe that they cannot afford to put money into TB control and strong health systems because of financial strains on their governments. For example, as the economic and financial crisis in Asia worsens, many gains in TB control could quickly crumble if public health budgets become a target for government savings. But with TB still on the rise, it is clear that countries cannot afford not to make an immediate investment in their citizens' health.



Border screenings useless against airborne killer

Countries that are considering medical screening to close their borders to infected immigrants, refugees, migrant workers and even visitors can inadvertently cause the TB epidemic to worsen. Those infected will often delay or completely avoid seeking treatment if they fear harsh penalties or deportation.

- A medical society in an Asian country recently urged better screening of foreigners to stem the rise in tuberculosis cases. A spokesman for the society acknowledged the country's dependence on foreign labor, but said "we must not allow progress at the expense of our citizens." In March 1998, a news story reported that the country's health ministry asked the immigration department to deport 1,030 legal foreign workers who were found to suffer from infectious disease, including TB.

- A wealthy industrialized country announced a plan to overhaul its antiquated testing systems, tailoring tests to immigrants' country of origin. One

proposed clause would deny entry to "any individual who is, or is likely to be, a danger to public health or public safety." The plan states that immigrants and visitors who break their agreement to visit public health clinics should meet with "meaningful consequential penalties."

Although it is essential for countries to address serious public health threats within their borders, there are no screening measures that fully protect citizens against all infectious diseases—particularly one like TB, which is spread through the air and currently infects one in three persons in the world.

TB on the move

With people crossing national borders more than ever, infectious diseases can now travel anywhere in the world, afflicting larger populations and spreading

as quickly as man can travel. Tourism, international travel, and migration are at an all-time high. The number of refugees and displaced people in the world has increased nine-fold in 20 years.

Because there are no walls or borders that can keep TB at bay, strict screening guidelines

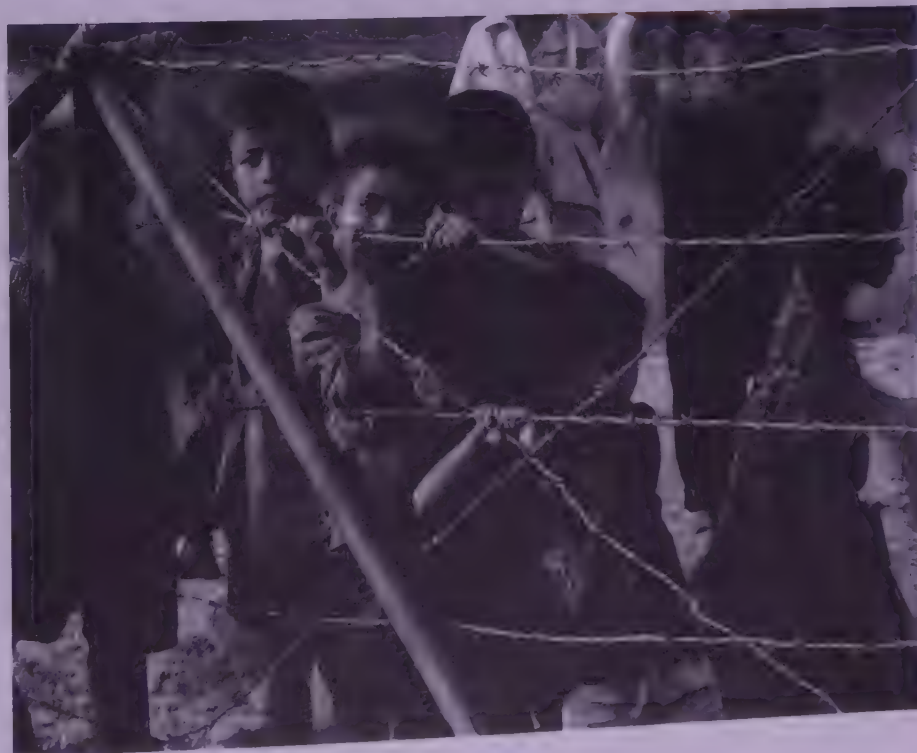
used as an exclusionary measure against certain immigrant groups or countries can actually worsen the epidemic if infectious patients are afraid to seek

treatment or continue treatment once they enter a new country.

Two initiatives from the United States demonstrated this. In 1994, the Mexican and U.S. governments implemented a cross-border programme to address the high rate of TB cases in this region. The programme had a difficult time tracking patient treatment progress, however, because of patients' fears of deportation. "It is very hard for us know when people are going to cross the border because few people want to

divulge those plans," said Dr Julio Robledo, Tijuana's chief of TB control. When these patients travel to another country, there is no way to ensure they complete

"Closing borders to immigrant and refugee groups will not protect a country from infectious disease."



treatment, are cured and no longer infect others. "All we can do for now is impress upon patients the critical need to continue treatment and tell them where to find it wherever they go."

That same year, California voters approved Proposition 187, which would require publicly funded health care facilities to deny care to illegal immigrants and to report them to government officials. Opponents of Proposition 187 believed it could endanger public health because illegal immigrants, some infected with TB, would be hesitant to seek care, and diseases such as tuberculosis would be "driven underground." (In November 1997, a federal judge declared the law unconstitutional.)

Global solutions required

Rather than striving to isolate themselves, countries may be better served to address the TB epidemic as a global problem

that demands global solutions.

A European task force on TB control and international migration, including representatives from WHO's Global TB Programme, recommends that the main objective of any screening procedure should be to intervene with treatment solutions, not to prevent entry of certain populations. Immediate access to culturally- and socially-

sensitive TB control services should be the goal of all nations.

Countries can also look beyond their own borders to address this critical issue. In December 1997, the United States Congress allotted US \$50 million in new money to the U.S. Agency for International Development (USAID) to help developing countries fight infectious diseases such as TB. Senator

Patrick Leahy argued that it was critical to address TB on a global scale, rather than as a domestic issue. "We're not 'fortress America,' " Leahy explained in a press interview. "Diseases don't just check in with our Customs service when they come across the border."



The Global TB Programme Responds

The primary objective of WHO's Global TB Programme (GTB) is to significantly reduce TB sickness and death in the world.

Through its initiatives, GTB works to ensure that effective TB control is implemented as part of a broad strategy that strengthens general health services and includes a focus on gender equity, poverty alleviation, and increased local and national resource mobilization.

The collective expertise of GTB staff—and their partners in national health institutions and NGOs fighting TB—forms the foundation of these initiatives which are designed to ensure that DOTS is used more widely and is enhanced as research provides new and better tools.

Global Monitoring and Surveillance

GTB has taken the lead role in monitoring the magnitude of the epidemic world-wide. As part of its global monitoring and surveillance project, a database was created in 1995 to track epidemiological information received from countries, to describe the extent of the global TB problem, and to assess countries' progress in finding TB patients and achieving and sustaining high cure rates.

A drug resistance surveillance network—established in 1994 in collaboration with the International Union Against Tuberculosis and Lung Disease and 22 international reference laboratories—now includes projects in over 40 countries.

Country Support

An integral part of GTB's mission is to help countries adopt the policies and develop the technical and managerial expertise necessary to implement, evaluate and improve TB control. Country support includes in-depth review of TB control initiatives to help guide policy formation and technical operations, dissemination of technical guidelines and educational materials, and human resource development to build country capacity to sustain effective TB control.

Research and New Tool Development

Through its Global Tuberculosis Research Initiative (GTRI), GTB is guiding the development of a prioritized global TB research agenda. The initiative seeks to optimize the use of existing research resources, coordinate the efforts of all stakeholders, and increase financial support for future TB research. Priority areas include operational and health systems research in developing countries, new vaccine development, new drug development, and improved diagnostic tools and treatment regimens.

Advocacy and Social Mobilization

To successfully expand DOTS, all stakeholders (governments, NGOs and donor agencies) must join forces to make TB control a priority. Through advocacy, media relations, publications and social mobilization activities, GTB works to build the political will necessary for governments to sustain effective TB control, to heighten public awareness about TB as a serious public health emergency, and to sustain donor support for TB control in endemic countries.

New Initiatives

GTB also focuses on using the health outcome-oriented features of the DOTS strategy to strengthen other operations in general health services. Lessons from TB experience are helping to develop packages of care for adult lung health and improved management of TB-HIV co-infection.



Global Tuberculosis Programme

Income 1996-1997 (US\$)

Category	1996	1997	1996-1997
Regular Budget			
Global and Interregional	1,313,202	1,114,108	2,427,310
Intensified WHO Cooperation	104,385	116,293	220,678
Subtotal	1,417,587	1,230,401	2,647,988
Extrabudgetary Contributions			
Unspecified			
Australia	388,877	429,110	817,987
Belgium	31,746	28,736	60,482
Germany	903,514	413,826	1,317,340
Ireland	235,500	—	235,500
Italy	—	232,558	232,558
Japan	1,300,000	1,300,000	2,600,000
Luxembourg	150,000	139,587	289,587
Netherlands	972,022	935,507	1,907,529
Norway	276,987	857,878	1,134,865
Sweden	300,186	217,971	518,157
Switzerland	775,194	714,286	1,489,480
United Kingdom	1,793,835	—	1,793,835
World Bank	86,128	—	86,128
Miscellaneous	2,094	1,216	3,310
Subtotal	7,216,083	5,270,675	12,486,758
Specified			
Australia	120,450	51,450	171,900
Belgium	126,984	114,942	241,926
Damien Foundation	65,360	—	65,360
Ireland	—	78,170	78,170
Japan (through UNAIDS)	—	427,358	427,358
Netherlands	233,510	387,244	620,754
Norwegian Heart & Lung Association	35,000	50,000	85,000
UNAIDS Core Budget Contribution	—	700,000	700,000
United Kingdom	60,332	221,458	281,790
United States	325,000	325,000	650,000
United States (through UNAIDS)	—	707,547	707,547
World Bank	5,750	—	5,750
Subtotal	972,386	3,063,169	4,035,555
Expert Services (staff assignments)			
Australia	—	157,160	157,160
Italy	120,900	—	120,900
United States	165,729	—	165,729
Netherlands	—	132,500	132,500
Subtotal	286,629	289,660	576,289
Interest Earned - available January 1998		791,220	791,220
GRAND TOTAL	9,892,685	10,645,125	20,537,810

Global Tuberculosis Programme

Expenditures 1996-1997 (US\$)

Major Activity Area	1996	1997	1996-97
Country & Interregional Support	633,579	841,794	1,475,373
Tools Development & Training Support	877,866	1,485,614	2,363,480
Planning & Management			
Regional Staff	318,893	731,155	1,050,048
Headquarters Staff	1,752,844	1,525,726	3,278,570
Unit Operating Costs	44,980	84,936	129,916
TOTAL	3,628,162	4,669,225	8,297,387
Monitoring & Surveillance	324,977	372,296	697,274
DOTS More Widely Research	39,524	534,571	574,095
DOTS More Easily Research	122,257	260,718	382,975
Beyond DOTS Research	619,896	99,241	719,137
Planning & Management			
Regional Staff	90,536	52,746	143,282
Headquarters Staff	1,408,674	1,454,039	2,862,713
Unit Operating Costs	41,668	97,755	139,423
TOTAL	2,647,532	2,871,367	5,518,898
Advocacy, Education,			
Media & Publications	361,913	865,676	1,227,589
Administrative Support Systems	60,409	82,127	142,536
Management & Advisory Bodies	94,812	104,853	199,664
Planning & Management			
Headquarters Staff	1,122,858	1,415,545	2,538,403
Unit Operating Costs	174,264	159,535	333,799
TOTAL	1,814,255	2,627,736	4,441,991
GRAND TOTAL	8,089,949	10,168,327	18,258,276

Note: Figures are indicative. For illustrative purposes, staff figures are based upon disbursement.

Data on the Tuberculosis Epidemic

AFRICA

TB Cases, 1996

Infectious Cases (SS+), 1996

COUNTRY	Estimated # of TB Cases	Officially Reported # of TB Cases	Estimated # of SS+	Officially Reported #SS+ Overall	% of SS+ Cases Detected by		
					DOTS	Non-DOTS	Overall
Algeria	15,256	—	6,865	—	—	—	—
Angola	25,166	15,424	11,325	8,016	—	70.8	70.8
Benin	7,510	2,372	3,380	1,868	55.3	—	55.3
Botswana	5,936	6,636	2,671	2,393	89.6	—	89.6
Burkina Faso	31,154	1,814	14,019	1,381	9.9	—	9.9
Burundi	22,831	3,796	10,274	1,533	14.9	—	14.9
Cameroon	26,306	3,049	11,838	2,312	2.8	16.7	19.5
Cape Verde	396	—	178	—	—	—	—
Central African Republic	4,648	—	2,092	—	—	—	—
Chad	10,880	1,936	4,896	870	17.8	—	17.8
Comoros	948	140	427	111	26.0	—	26.0
Congo	6,670	—	3,002	—	—	—	—
Congo (Dem. Republic)	155,884	45,999	70,148	24,125	34.4	—	34.4
Equatorial Guinea	615	—	277	—	—	—	—
Eritrea	5,084	5,220	2,288	—	—	—	—
Ethiopia	90,277	171,033	40,624	9,225	22.7	—	22.7
Gabon	1,106	891	498	249	—	50.0	50.0
Gambia	1,894	1,242	852	743	87.2	—	87.2
Ghana	39,587	10,449	17,814	6,474	13.6	22.7	36.3
Guinea	12,480	4,286	5,616	2,844	50.6	—	50.6
Guinea-Bissau	2,400	1,728	1,080	922	—	85.4	85.4
Ivory Coast	27,469	13,104	12,361	8,927	72.2	—	72.2
Kenya	38,919	34,980	17,513	16,978	96.9	—	96.9
Lesotho	5,195	4,361	2,338	1,788	76.5	—	76.5
Liberia	2,245	840	1,010	668	66.1	—	66.1
Madagascar	47,594	12,718	21,417	8,456	39.5	—	39.5
Malawi	17,032	20,630	7,664	6,703	87.5	—	87.5
Mali	32,127	3,655	14,480	2,173	15.0	—	15.0
Mauritania	5,133	—	2,310	—	—	—	—
Mauritius	565	—	254	—	—	—	—
Mozambique	33,634	18,443	15,135	10,478	69.2	—	69.2
Namibia	6,300	6,773	2,835	2,820	99.5	—	99.5
Niger	13,630	—	6,133	—	—	—	—
Nigeria	255,344	24,063	114,905	15,704	13.7	—	13.7
Rwanda	14,032	3,535	6,314	2,034	32.2	—	32.2
Sao Tome and Principe	135	—	61	—	—	—	—
Senegal	14,163	8,516	6,373	5,940	93.2	—	93.2
Seychelles	30	15	13	9	69.2	—	69.2
Sierra Leone	7,176	3,241	3,229	2,234	69.2	—	69.2
South Africa	105,983	91,578	47,692	37,178	—	78.0	78.0
St. Helena	5	—	3	—	—	—	—
Swaziland	1,762	3,893	793	2,226	—	280.7	280.7
Tanzania (United Rep.)	57,594	44,416	25,917	21,472	82.8	—	82.8
Togo	10,250	1,654	4,613	913	19.8	—	19.8
Uganda	60,768	27,356	27,346	15,175	—	55.5	55.5
Zambia	28,549	40,417	12,847	12,072	—	94	94
Zimbabwe	23,678	35,735	10,655	11,965	—	112	112
REGIONAL TOTAL	1,276,341	675,938	574,375	248,979	27.0	16.3	43.3

Treatment Outcomes in DOTS Programmes, 1995

Registered Cases (New SS+)	Cured (%)	Completed Treatment (%)	Defaulted (%)	Failed (%)	Died (%)	Transferred Out (%)	Not Evaluated (%)	Treatment Success (%)
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
1,785	51.6	21.8	17.4	1.5	5.7	1.7	0.3	73.4
2,060	13.2	54.1	12.4	0.7	4.9	11.7	3.1	67.3
1,200	22.1	2.4	3.2	0.8	4.7	1.3	65.5	24.5
1,798	25.1	20.0	14.1	0.2	2.9	13.6	24.2	45.1
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
529	16.8	30.2	42.7	1.1	5.7	3.4	0.0	47.1
113	90.3	0.0	6.2	0.0	3.5	0.0	0.0	90.3
—	—	—	—	—	—	—	—	—
8,052	63.9	15.9	8.3	1.5	5.5	5.0	0.0	79.8
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
5,042	57.7	2.0	14.1	1.4	5.4	4.2	15.2	59.7
—	—	—	—	—	—	—	—	—
686	68.7	7.4	12.8	1.0	5.1	5.0	0.0	76.1
361	41.0	12.7	11.4	1.9	10.8	8.6	13.6	53.7
2263	61.5	16.8	9.2	1.5	6.3	4.6	0.0	78.3
—	—	—	—	—	—	—	—	—
7,221	62.5	5.7	17.3	1.5	4.3	6.9	1.8	68.3
6,470	60.4	14.3	8.9	0.8	8.6	7.0	0.0	74.7
1,788	32.5	14.4	9.1	0.4	7.4	7.0	29.3	46.9
1,595	78.9	—	11.6	4.6	4.9	0.0	0.0	78.9
9,101	47.0	8.2	16.4	1.8	6.5	2.8	17.4	55.2
6,293	64.5	6.1	0.0	1.1	18.7	3.9	5.7	70.6
1,290	40.9	18.2	21.8	0.4	4.7	14.0	0.0	59.1
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
10,566	34.0	5.0	9.4	0.7	3.0	4.1	43.7	39.0
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
9,476	34.0	15.1	9.0	2.0	4.7	1.0	34.2	49.1
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
5,421	31.5	7.8	12.2	3.9	3.1	6.5	35.0	39.3
9	88.9	0.0	0.0	0.0	11.1	0.0	0.0	88.9
1,315	54.6	14.7	16.1	7.4	5.4	1.8	0.0	69.3
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
19,955	68.7	4.8	5.7	0.6	8.8	3.9	7.5	73.5
856	42.4	17.9	17.4	2.6	9.2	2.3	8.2	60.3
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
105,245	51.9	10.0	10.2	1.4	6.7	4.5	15.2	61.9

AMERICAS

COUNTRY	TB Cases, 1996		Infectious Cases (SS+), 1996				
	Estimated # of TB Cases	Officially Reported # of TB Cases	Estimated # of SS+	Officially Reported #SS+ Overall	% of SS+ Cases Detected by		
					DOTS	Non-DOTS	Overall
Anguilla	2	—	1	—	—	—	—
Antigua and Barbuda	13	5	6	2	—	33.3	33.3
Argentina	17,610	13,397	7,924	5,787	—	73.0	73.0
Bahamas	85	59	38	26	—	68.4	68.4
Barbados	52	3	23	3	—	13.0	13.0
Belize	88	53	39	20	51.3	—	51.3
Bermuda	13	—	6	—	—	—	—
Bolivia	25,437	10,194	11,446	6,949	60.7	—	60.7
Brazil	128,870	87,254	57,991	44,501	—	76.7	76.7
Canada	2,374	—	1,068	—	—	—	—
Cayman Islands	6	0	3	0	—	0.0	0.0
Chile	9,662	4,038	4,348	1,480	34.0	—	34.0
Colombia	24,417	9,702	10,988	7,572	—	68.9	68.9
Costa Rica	525	162	236	122	—	51.7	51.7
Cuba	2,204	1,579	992	835	84.2	—	84.2
Dominica	14	10	6	7	—	116.7	116.7
Dominican Republic	8,757	6,006	3,941	3,609	—	91.6	91.6
Ecuador	19,420	6,327	8,739	4,356	—	49.8	49.8
El Salvador	6,376	1,686	2,869	965	—	33.6	33.6
Grenada	18	—	8	—	—	—	—
Guatemala	12,021	3,496	5,409	2,308	42.7	—	42.7
Guyana	419	314	189	71	—	37.6	37.6
Haiti	24,172	6,632	10,878	3,524	—	32.4	32.4
Honduras	7,735	4,176	3,481	1,739	—	50.0	50.0
Jamaica	249	121	112	75	67.0	—	67.0
Mexico	55,631	10,852	25,034	8,495	—	33.9	33.9
Montserrat	2	—	1	—	—	—	—
Netherlands Antilles	39	—	18	—	—	—	—
Nicaragua	4,662	3,003	2,098	1,722	82.1	—	82.1
Panama	2,409	1,099	1,084	904	—	83.4	83.4
Paraguay	8,229	2,148	3,703	894	24.1	—	24.1
Peru	59,860	41,739	26,937	26,800	99.5	—	99.5
Puerto Rico	299	219	134	110	82.1	—	82.1
Saint Kitts and Nevis	10	3	5	2	—	40.0	40.0
Saint Lucia	29	—	13	—	—	—	—
Saint Vincent/Grenadines	28	—	13	—	—	—	—
Suriname	432	53	194	39	—	20.1	20.1
Trinidad and Tobago	259	205	117	59	—	50.4	50.4
Turks and Caicos Islands	3	—	1	—	—	—	—
Uruguay	641	701	288	426	147.9	—	147.9
USA	23,172	21,337	10,427	7,401	71.0	—	71.0
Venezuela	9,817	5,576	4,418	3,195	72.3	—	72.3
Virgin Islands (UK)	4	—	2	—	—	—	—
Virgin Islands (USA)	9.5	8	5	5	100.0	—	100.0
REGIONAL TOTAL	456,075	242,157	205,233	134,003	25.4	39.8	65.3

Treatment Outcomes in DOTS Programmes, 1995

Registered Cases (New SS+)	Cured (%)	Completed Treatment (%)	Defaulted (%)	Failed (%)	Died (%)	Transferred Out (%)	Not Evaluated (%)	Treatment Success (%)
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
29	51.7	0.0	27.6	3.4	10.3	6.9	0.0	51.7
—	—	—	—	—	—	—	—	—
7,010	53.5	8.6	9.5	0.9	3.5	5.2	18.7	62.1
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
1,111	79.0	—	8.1	0.1	7.4	5.4	0.0	79.0
—	—	—	—	—	—	—	—	—
834	89.6	0.0	1.6	2.5	4.4	0.7	1.2	89.6
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
2,368	56.1	5.3	4.0	0.7	3.3	1.9	28.8	61.4
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
93	2.2	64.5	17.2	1.1	9.7	5.4	0.0	66.7
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
1,536	66.0	14.1	9.6	2.3	4.4	3.7	0.0	80.0
—	—	—	—	—	—	—	—	—
748	7.9	43.0	16.7	0.0	3.2	8.3	20.9	50.9
28,185	74.6	8.8	5.6	1.9	2.9	1.2	4.9	83.4
128	64.8	—	6.3	—	17.2	11.7	0.0	64.8
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
370	41.1	27.3	3.8	1.1	9.7	—	17.0	68.4
8,047	71.9	—	2.7	—	12.8	4.9	7.6	71.9
3,056	68.2	6.2	7.8	0.8	3.7	3.8	9.5	74.3
—	—	—	—	—	—	—	—	—
2	50.0	—	0.0	0.0	0.0	50.0	0.0	50.0
53,517	69.0	7.7	6.0	1.3	4.8	2.7	8.4	76.7

EASTERN MEDITERRANEAN

COUNTRY	TB Cases, 1996		Infectious Cases (SS+), 1996				
	Estimated # of TB Cases	Officially Reported # of TB Cases	Estimated # of SS+	Officially Reported #SS+ Overall	% of SS+ Cases Detected by		
					DOTS	Non-DOTS	Overall
Afghanistan	58,055	—	26,125	—	—	—	—
Bahrain	143	156	64	121	—	189.1	189.1
Cyprus	113	24	51	3	—	5.9	5.9
Djibouti	3,702	3071	1,666	1,796	107.8	—	107.8
Egypt	49,351	12,338	22,208	5,084	0.2	22.7	22.9
Iran	58,079	14,189	26,136	5,373	—	20.6	20.6
Iraq	30,911	29,196	13,910	10,240	—	73.6	73.6
Jordan	781	474	352	170	—	48.3	48.3
Kuwait	675	400	304	153	—	50.3	50.3
Lebanon	1,079	836	486	198	—	40.7	40.7
Libyan Arab Jamahiriya	671	1,282	302	515	—	170.5	170.5
Morocco	33,776	31,771	15,199	14,278	93.9	—	93.9
Oman	460	222	207	108	52.2	—	52.2
Pakistan	209,960	4,307	94,482	1,849	2.0	—	2.0
Qatar	279	257	126	43	34.1	—	34.1
Saudi Arabia	4,144	—	1,865	—	—	—	—
Somalia	21,805	3,251	9,812	2,318	23.6	—	23.6
Sudan	57,584	20,280	25,913	8,978	2.0	32.6	34.6
Syrian Arab Republic	8,453	5,200	3,804	1,523	—	40.0	40.0
Tunisia	5,036	2,387	2,266	1,005	—	44.4	44.4
United Arab Emirates	678	507	305	—	—	—	—
West Bank/Gaza Strip	406	40	183	24	—	13.1	13.1
Yemen	15,051	14,364	6,773	4,371	10.1	54.5	64.5
REGIONAL TOTAL	561,192	144,552	252,539	58,150	8.6	14.5	23.0

SOUTH-EAST ASIA

COUNTRY	TB Cases, 1996		Infectious Cases (SS+), 1996				
	Estimated # of TB Cases	Officially Reported # of TB Cases	Estimated # of SS+	Officially Reported #SS+ Overall	% of SS+ Cases Detected by		
					DOTS	Non-DOTS	Overall
Bangladesh	264,161	63,471	118,872	29,674	16.5	8.5	25.0
Bhutan	1,631	1,271	734	308	42.0	—	42.0
DPR Korea	36,395	—	16,378	—	—	—	—
India	2,078,076	1,300,935	935,134	291,205	0.7	30.5	31.1
Indonesia	442,820	24,647	199,269	11,790	5.9	—	5.9
Maldives	316	212	142	106	74.6	—	74.6
Myanmar	86,793	22,201	39,057	9,716	22.5	2.4	24.9
Nepal	36,775	22,970	16,549	10,365	6.8	55.8	62.6
Sri Lanka	30,227	5,439	13,602	2,958	21.7	—	21.7
Thailand	101,556	39,871	45,700	16,997	0.3	36.9	37.2
REGIONAL TOTAL	3,078,750	1,481,017	1,385,437	373,119	3.7	23.2	26.9

Treatment Outcomes in DOTS Programmes, 1995

Registered Cases (New SS+)	Cured (%)	Completed Treatment (%)	Defaulted (%)	Failed (%)	Died (%)	Transferred Out (%)	Not Evaluated (%)	Treatment Success (%)
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
1,751	60.0	15.5	19.9	0.7	3.3	0.0	0.6	75.5
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
14,171	70.4	13.8	6.8	0.9	1.9	5.6	0.6	84.2
93	83.9	0.0	1.1	1.1	8.6	5.4	0.0	83.9
802	50.7	19.7	20.4	0.9	3.9	2.5	1.9	70.4
43	81.4	0.0	0.0	0.0	4.7	14.0	0.0	81.4
—	—	—	—	—	—	—	—	—
1,278	81.9	4.1	5.0	4.8	3.8	0.0	0.4	86.0
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
18,138	69.4	13.4	8.5	1.1	2.3	4.6	0.6	82.9

Treatment Outcomes in DOTS Programmes, 1995

Registered Cases (New SS+)	Cured (%)	Completed Treatment (%)	Defaulted (%)	Failed (%)	Died (%)	Transferred Out (%)	Not Evaluated (%)	Treatment Success (%)
10,867	66.4	4.9	10.1	1.5	4.9	2.7	9.4	71.4
433	77.6	19.6	0.7	0.5	0.5	1.2	0.0	97.2
—	—	—	—	—	—	—	—	—
2,089	75.5	3.3	7.6	3.4	3.4	6.9	0.0	78.8
3,018	73.1	17.6	6.0	0.4	1.9	1.0	0.0	90.7
114	95.6	1.8	0.0	0.0	2.6	0.0	0.0	97.4
6,995	54.1	12.0	18.4	3.8	4.1	7.7	0.0	66.0
—	—	—	—	—	—	—	—	—
3,058	75.1	4.3	13.3	0.5	3.1	3.7	0.0	79.4
—	—	—	—	—	—	—	—	—
26,574	66.0	8.2	11.8	2.0	3.9	4.2	3.9	74.2

EUROPE

TB Cases, 1996

Infectious Cases (SS+), 1996

COUNTRY	Estimated # of TB Cases	Officially Reported # of TB Cases	Estimated # of SS+	Officially Reported #SS+ Overall	% of SS+ Cases Detected by		
					DOTS	Non-DOTS	Overall
Albania	1,360	738	612	173	—	28.3	28.3
Andorra	28	17	13	8	—	61.5	61.5
Armenia	1,455	928	655	327	29.3	20.6	49.9
Austria	1,621	1,375	730	580	—	79.5	79.5
Azerbaijan	3,569	2,480	1,606	990	10.9	50.7	61.6
Belarus	5,174	5,598	2,328	2,117	—	90.9	90.9
Belgium	1,625	1,348	731	364	—	49.8	49.8
Bosnia and Herzegovina	2,902	2,220	1,306	927	—	71.0	71.0
Bulgaria	3,387	3,109	1,524	903	—	59.3	59.3
Croatia	2,926	2,174	1,317	1,228	—	93.2	93.2
Czech Republic	2,563	1,969	1,153	586	50.8	—	50.8
Denmark	628	484	283	97	—	34.3	34.3
Estonia	883	521	397	240	—	60.5	60.5
Fed. Rep. of Yugoslavia	5,147	4,017	2,316	1,783	—	77.0	77.0
Finland	769	645	346	240	—	69.4	69.4
France	11,667	7,656	5,250	3,002	—	57.2	57.2
Georgia	3,809	3,522	1,714	482	28.1	—	28.1
Germany	14,746	11,814	6,636	3,689	—	55.6	55.6
Greece	1,259	—	566	—	—	—	—
Hungary	5,025	4,403	2,261	1,066	—	47.1	47.1
Iceland	27	11	12	1	—	8.3	8.3
Ireland	640	434	288	339	—	117.7	117.7
Israel	680	369	306	147	—	48.0	48.0
Italy	8,584	4,155	3,863	1,738	9.5	35.5	45.0
Kazakstan	12,951	13,944	5,828	4,290	—	73.6	73.6
Kyrgyzstan	3,039	4,093	1,368	991	4.2	68.3	72.4
Latvia	1,753	1,761	789	575	72.9	—	72.9
Liechtenstein	3	—	1	—	—	—	—
Lithuania	3,057	2,608	1,376	1,121	—	81.5	81.5
Luxembourg	41	41	19	29	—	152.6	152.6
Malta	37	28	17	5	29.4	—	29.4
Monaco	2	0	1	0	—	0.0	0.0
Netherlands	2,025	1,678	911	358	39.3	—	39.3
Norway	348	217	157	103	65.6	—	65.6
Poland	19,301	15,358	8,685	6,819	—	78.5	78.5
Portugal	5,885	5,248	2,648	1,938	73.2	—	73.2
Republic of Moldova	3,111	2,922	1,400	219	—	15.6	15.6
Romania	27,186	24,189	12,234	10,359	—	84.7	84.7
Russian Federation	146,645	111,075	65,990	42,534	0.5	64.0	64.5
San Marino	3	0	1	0	—	0.0	0.0
Slovakia	2,139	1,503	962	760	79.0	—	79.0
Slovenia	673	563	303	221	72.9	—	72.9
Spain	19,440	8,331	8,748	8,331	—	95.2	95.2
Sweden	617	497	278	90	—	32.4	32.4
Switzerland	1,300	764	585	172	—	29.4	29.4
Tajikistan	7,894	1647	3,552	232	—	6.5	6.5
TFYR Macedonia	1,304	724	587	209	—	35.6	35.6
Turkey	35,224	20,212	15,851	2,816	—	17.8	17.8
Turkmenistan	2,992	2,072	1,346	557	—	41.4	41.4
Ukraine	25,804	23,414	11,612	7,827	—	67.4	67.4
United Kingdom	6,977	6,238	3,140	4,147	—	132.1	132.1
Uzbekistan	12,765	11,919	5,744	3,350	—	58.3	58.3
REGIONAL TOTAL	422,990	321,033	190,346	119,080	3.2	59.4	62.6

Treatment Outcomes in DOTS Programmes, 1995

Registered Cases (New SS+)	Cured (%)	Completed Treatment (%)	Defaulted (%)	Failed (%)	Died (%)	Transferred Out (%)	Not Evaluated (%)	Treatment Success (%)
—	—	—	—	—	—	—	—	—
76	68.4	14.5	5.3	7.9	1.3	2.6	0.0	82.9
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
487	56.7	3.5	1.6	2.9	0.2	0.0	35.1	60.2
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
221	40.7	17.6	29.0	2.7	7.7	2.3	0.0	58.4
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
295	73.2	6.4	10.8	1.7	3.4	4.4	0.0	79.7
—	—	—	—	—	—	—	—	—
475	61.1	0.0	21.1	2.5	8.6	6.7	0.0	61.1
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
5	80.0	20.0	0.0	0.0	0.0	0.0	0.0	100.0
—	—	—	—	—	—	—	—	—
715	17.1	54.8	5.0	—	8.3	3.2	11.6	71.9
87	42.5	34.5	8.0	1.1	13.8	0.0	0.0	77.0
—	—	—	—	—	—	—	—	—
1,240	45.2	23.5	4.0	4.4	3.9	1.2	17.8	68.7
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
54	53.7	11.1	11.1	5.6	14.8	3.7	0.0	64.8
0	—	—	—	—	—	—	—	—
807	64.2	—	3.7	—	16.5	0.4	15.2	64.2
270	64.1	25.6	1.5	2.2	3.7	3.0	0.0	89.6
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
4,732	50.0	18.5	7.2	2.3	7.2	2.2	12.6	68.5

WESTERN PACIFIC

COUNTRY	TB Cases, 1996		Infectious Cases (SS+), 1996				
	Estimated # of TB Cases	Officially Reported # of TB Cases	Estimated # of SS+	Officially Reported #SS+ Overall	% of SS+ Cases Detected by		
					DOTS	Non-DOTS	Overall
American Samoa	8	0	4	0	0.0	—	0.0
Australia	1,083	—	488	—	—	—	—
Brunei Darussalam	210	—	95	—	—	—	—
Cambodia	24,142	14,857	10,864	12,065	88.8	22.2	111.1
China	1,047,271	469,358	471,272	168,270	29.2	6.5	35.7
China, Hong Kong SAR	8,667	6501	3,900	2,116	—	54.3	54.3
Cook Islands	6	0	3	0	0.0	—	0.0
Fiji	319	200	143	69	48.3	—	48.3
French Polynesia	134	86	60	37	61.7	—	61.7
Guam	122	—	55	—	—	—	—
Japan	52,647	42,122	23,691	12,867	—	54.3	54.3
Kiribati	320	327	144	29	—	20.1	20.1
Lao People's Dem. Rep.	11,832	1,440	5,325	886	16.6	—	16.6
Macau	440	455	198	204	103.0	—	103.0
Malaysia	13,789	12,902	6,205	7,271	117.2	—	117.2
Marshall Islands	86	56	38	17	—	44.7	44.7
Micronesia (Fed. States)	76	94	34	10	29.4	—	29.4
Mongolia	2,515	2,987	1,132	1,171	62.3	41.2	103.4
Nauru	6	—	2	—	—	—	—
New Caledonia	166	205	75	26	34.7	—	34.7
New Zealand	360	323	162	76	—	46.9	46.9
Niue	3	2	1	1	—	100.0	100.0
Northern Mariana Isles	59	—	26	—	—	—	—
Palau	43	5	19	4	21.1	—	21.1
Papua New Guinea	12,100	5,087	5,445	652	3.8	8.2	12.0
Philippines	193,990	276,295	87,295	86,695	0.5	98.8	99.3
Republic of Korea	31,720	31,134	14,274	11,420	80.0	—	80.0
Samoa	50	37	22	10	45.5	—	45.5
Singapore	2,775	737	1,249	208	16.7	—	16.7
Solomon Islands	469	289	211	90	42.7	—	42.7
Tokelau	1	0	1	0	—	0.0	0.0
Tonga	39	22	18	16	88.9	—	88.9
Tuvalu	25	—	11	—	—	—	—
Vanuatu	209	126	94	50	—	53.2	53.2
Vietnam	124,800	74,711	56,160	48,911	67.1	20.0	87.1
Wallis and Futuna Isles	15	8	7	3	—	42.9	42.9
REGIONAL TOTAL	1,530,497	940,366	688,723	353,174	30.0	21.3	51.3

Treatment Outcomes in DOTS Programmes, 1995

Registered Cases (New SS+)	Cured (%)	Completed Treatment (%)	Defaulted (%)	Failed (%)	Died (%)	Transferred Out (%)	Not Evaluated (%)	Treatment Success (%)
4	100.0	0.0	0.0	0.0	0.0	—	0.0	100.0
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
4,363	83.1	7.7	4.2	1.1	2.2	1.5	0.0	90.8
99,528	94.5	1.4	0.8	1.0	1.5	0.3	0.4	95.8
—	—	—	—	—	—	—	—	—
0	—	—	—	—	—	—	—	—
73	78.1	8.2	2.7	0.0	6.8	0.0	4.1	86.3
33	66.7	0.0	21.2	0.0	3.0	3.0	6.1	66.7
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
343	62.4	7.6	19.0	1.7	5.5	3.8	0.0	70.0
—	—	—	—	—	—	—	—	—
13,398	69.5	—	8.1	2.0	6.3	14.2	0.0	69.5
—	—	—	—	—	—	—	—	—
10	80.0	0.0	10.0	0.0	10.0	—	0.0	80.0
128	78.1	0.0	6.3	6.3	6.3	3.1	0.0	78.1
—	—	—	—	—	—	—	—	—
32	75.0	—	3.1	—	12.5	—	9.4	75.0
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
9	55.6	11.1	11.1	0.0	0.0	22.2	0.0	66.7
199	—	59.8	22.1	0.0	1.0	3.5	13.6	59.8
—	—	—	—	—	—	—	—	—
11,675	74.2	2.2	4.8	3.3	1.5	10.2	3.7	76.4
15	13.3	66.7	0.0	0.0	20.0	—	0.0	80.0
122	71.3	14.8	11.5	0.0	2.5	0.0	0.0	86.1
368	—	65.2	3.5	0.0	5.7	1.9	23.6	65.2
—	—	—	—	—	—	—	—	—
20	75.0	0.0	0.0	5.0	10.0	10.0	0.0	75.0
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
21,954	89.1	2.1	2.2	1.4	2.7	2.4	0.0	91.3
—	—	—	—	—	—	—	—	—
152,274	89.1	1.9	2.2	1.4	2.2	2.7	0.6	91.0

05644

Data on the Tuberculosis Epidemic

The data presented in this section are from the *Global Tuberculosis Control—WHO Report 1998*, a publication of the Global TB Programme, Geneva. The report presents data available at 31 January 1998 on case notifications (1996) and treatment results (1995).

Estimated numbers of TB cases are derived from the 1990 incidence rates published in the World Bank's World Development Report 1993 and recalculated based on the 1996 population and reported TB cases.

Definitions

Cured — Initially smear-positive patient who had negative sputum smear results on at least two occasions during the continuation phase (four to six months), including one at completion of treatment.

Completed Treatment — Sputum-smear positive patient who had negative sputum smear results at the end of the initial phase after completion of treatment, with no or only one negative sputum smear result in the continuation phase and none at the end of treatment.

Defaulted (Interrupted Treatment) — Patient who did not collect drugs for two months or more at any time after registration.

Failed — Smear-positive patient who remained or became smear-positive again at least five months after the start of treatment.

Died — Patient who died during treatment, irrespective of cause.

Transferred Out — Patient who was transferred to another reporting unit and his/her treatment results are not known.

Percent Not Evaluated — Patients who were initially registered but not classified in any of the six treatment outcome categories.

Sputum Smear Positive (SS+) — Tuberculosis of the lungs (pulmonary TB) is diagnosed by examining a patient's sputum under a microscope. If TB bacilli are visible, the patient is classified as sputum smear positive or SS+. These cases are the most infectious and the top priority for TB control programmes.

Treatment Success — The sum of the percentage of cases cured and that of cases who completed treatment.



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What are your main areas of interest related to TB control?

Questions or comments on the DOTS strategy

Arata
Director, Global TB

Kraig
Acting Chief, Policy &

Project Manager/Editor

Writers: Mandy Mikulencak
Chris Holme


Designer: Agence Oscar  Ribes

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Global TB
World Health Organization
20, Avenue
CH-1211
Switzerland

Telephone: +41 (0)22 791 2111
Facsimile: +41 (0)22 791 2111
Web site: <http://www.who.int/tb>
E-mail: tb@who.int

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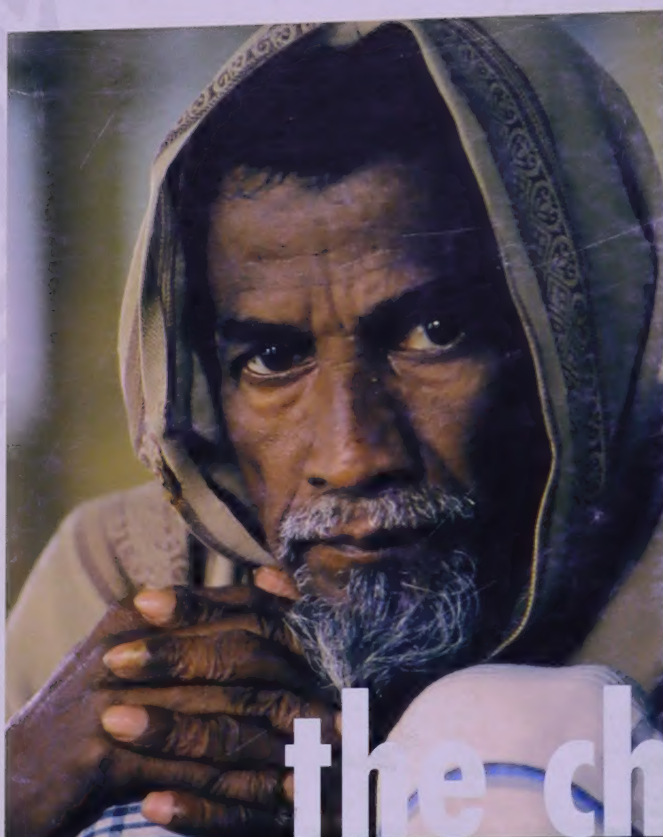
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the choice...

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the choice...



The world has the tools and the resources to determine the future of the TB epidemic.

It can be a future of expanded use of the DOTS strategy and the reverse of the epidemic.

Or it can be a future in which multidrug-resistance increases and millions more become ill.

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